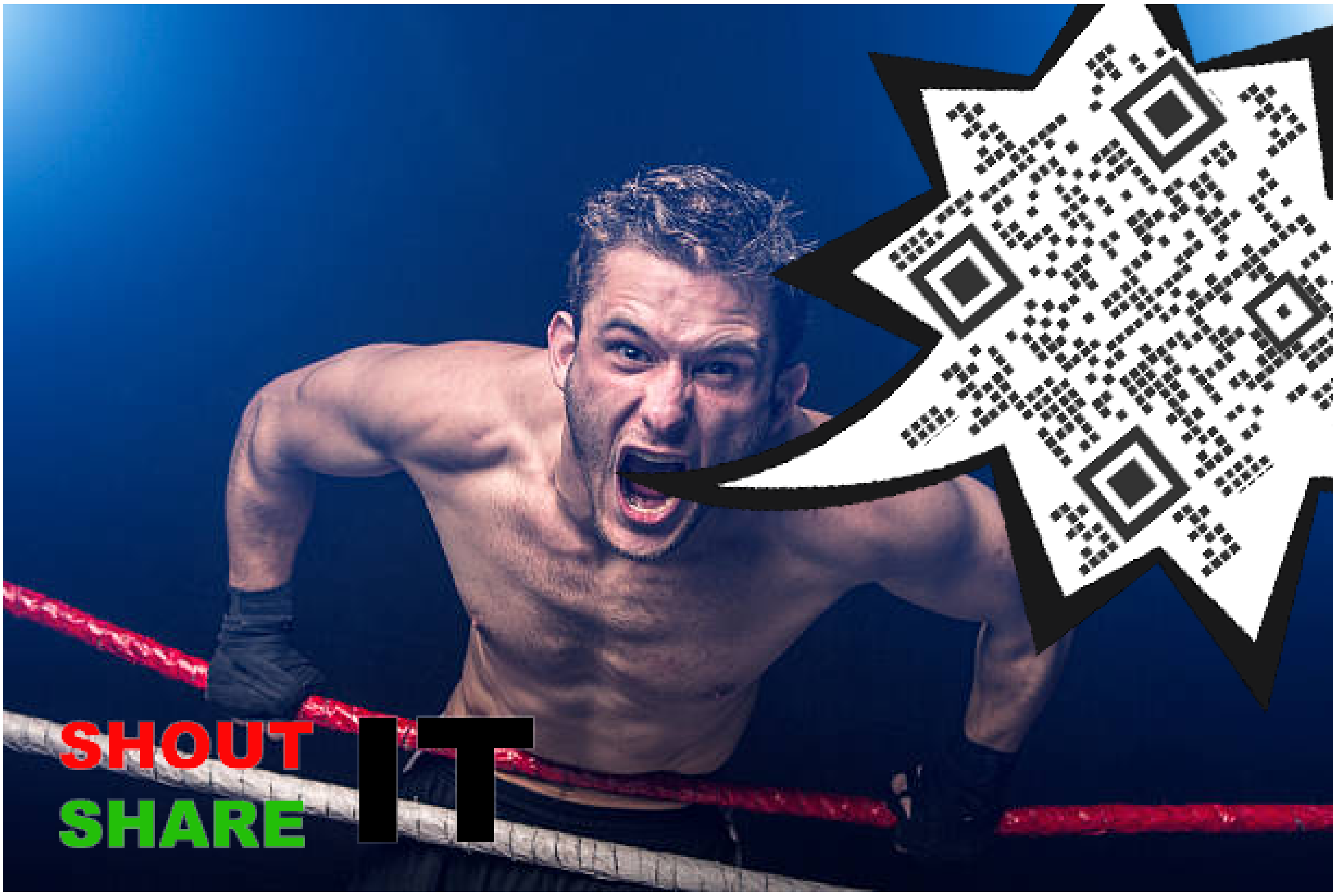
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# OCCASIONAL PAPERS

OF THE

# BERNICE PAUAHI BISHOP MUSEUM OF POLYNESIAN ETHNOLOGY AND NATURAL HISTORY.

## VOLUME I.

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# OCCASIONAL PAPERS

OF THE

# BERNICE PAUAHI BISHOP MUSEUM

OF

# POLYNESIAN ETHNOLOGY AND NATURAL HISTORY.

VOL. I. — NO. I

# DIRECTOR'S REPORT

HONOLULU:
HAWAIIAN ISLANDS.
1898.

**U. S. National Museum**

*Gift of*

*Otis T. Mason,*

*Curator of the Division of Ethnology*

Accession No. ....................................

# Exchange Notice.

The Bernice Pauahi Bishop Museum of Polynesian Ethnology and Natural History, founded and suitably endowed by Hon. Charles Reed Bishop, in Honolulu, desires to exchange its publications with other institutions having similar aims.

Two series are to be issued, one in octavo form (of which the accompanying Report is the first number): the other in quarto form, the first number of which is now in press.

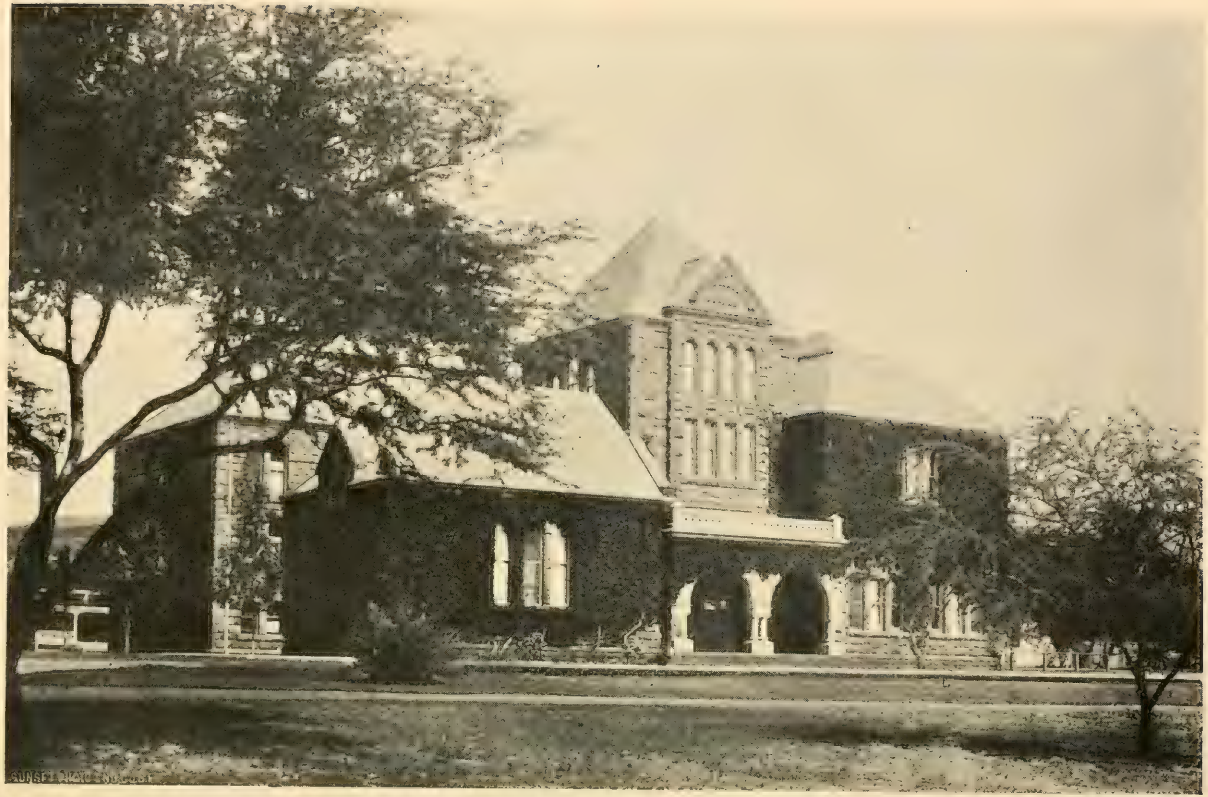
Among subjects already arranged for are the following:

*Hawaiian Feather Work.*
*An Index to the Islands of the Pacific.*
*Hawaiian Kapas.*
*The Fauna of the Hawaiian Islands.*
*Some Remarkable Hawaiian Crania.*
*Notes on Hawaiian Antiquities, Etc.*

It is hoped that the proposed establishment of a Marine Zoological Station in Honolulu by the Museum Trustees will give greater value to the Memoirs of this museum. Will you add our publications to your list of exchanges?

WM. T. BRIGHAM,
Director.

Honolulu, H. I., Oct. 1, 1898.



Bernice Pauahi Bishop Museum, 1897.

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# BERNICE PAUAHI BISHOP MUSEUM

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# POLYNESIAN ETHNOLOGY AND NATURAL HISTORY.

Vol. I. — No. 1.

## DIRECTOR'S REPORT

HONOLULU:
HAWAIIAN ISLANDS.
1898.

# PREFACE.

IN THIS initial number of the publications of the Bernice Pauahi Bishop Museum of Polynesian Ethnology and Natural History it seems proper to state that the Trustees have decided to issue such papers as seem to them worthy of publication on subjects germain to the objects and work of this Museum in one or the other of two series, one in quarto the other in octavo form. For the former the title of Memoirs, for the latter that of Occasional Papers has been selected. A small edition of each will be printed in the office attached to the Museum, mainly for exchange with other Museums or Societies issuing publications in similar lines. The date of publication will be irregular, and as papers are ready they will be issued: applications for copies or exchanges should be made to the Director.

---

The Princess Pauahi was descended from a long line of Kings and Alii. She was great-granddaughter both of Kalaniopuu, the King of Hawaii at the time of Cook's visit, and of Kamehameha the Great the remarkable Hawaiian who succeeded that King and after gaining undisputed authority over his island of Hawaii carried his victorious arms to Maui and Oahu, and on the last island receiving the capitulation of Kaumualii the King of Kauai thus completing the conquest and unification of the entire Group.

Pauahi was educated with the other Alii at the Royal School and early gave evidence of her capabilities and sterling character. At an early age she was married to Charles Reed Bishop who had come to the Islands from the State of New York, and during a long and happy life was regarded both by her own people and by all foreigners who knew her the beloved Chief Lady of the land. Her accomplishments were many but they yielded to the beauty of her character. October 16, 1884, Mrs. Bishop died leaving her entire estate to found schools for the youth of her race. Five years later, when her bequest was actively accomplishing her desires, her husband founded this Museum in the midst of the school at Kalihi, a western suburb of Honolulu. Although the founder of Kamehameha Schools needed no other monument than these schools it was peculiarly fitting that a memorial to her should be placed in their midst to preserve and exhibit to all who care to look relics of her people and the kindred races of the Pacific Ocean.

This Museum, founded in 1889 and growing slowly for several years, has now attained an honorable position among Ethnological Museums, nor has it wholly neglected the other object of its foundation but has done much for the Entomology and Ornithology of the Hawaiian Islands as will be seen by subsequent publications.

Twice during its first decade has it outgrown its buildings, twice have generous additions been made to its exhibition and work rooms. Foundations have been laid for a fine hall to contain Hawaiian exhibits. Both Museum and Schools try to illustrate the truth of the memorial inscription in the entrance hall of the former:

> "*BERNICE PAUAHI BISHOP:*
>
> *A bright light among her people, her usefulness survives her mortal life.*"

---

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September, 1898.

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The pen and ink sketches are from the Director's note book: the photographs of objects in the British Museum are by Mr. Henry Oldland of that museum: the objects in the Vienna Museum and the half-tones prepared by Löwy: the other half-tones and zincographs by the Sunset Photo-Engraving Co. of San Francisco.

## *Report of a Journey around the world undertaken to examine various Ethnological Collections.*

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In view of the fact that many implements and objects of ethnological interest have been deposited in American and European museums by early collectors or their heirs,—objects no longer made or used by the natives of the islands of the Pacific Ocean (the region recognized as the field of operations of this Museum),—the Trustees of the BERNICE PAUAHI BISHOP MUSEUM decided to authorize the Director to visit and examine the principal Ethnological museums of the world, hoping that besides studying the rare and now unattainable ethnological objects in those museums, he might arrange exchanges of duplicates or publications, obtain photographs of interesting specimens, and learn what might be new or of value in the arrangement or management of such institutions, and in the preservation of their contents.

The Director left Honolulu January 28, 1896, on the Steamer 'Warrimoo' for Sydney, N.S.W. Touching at Suva, Fiji, for a few hours, a glimpse was obtained of the very interesting Vitians, and their fine forms, dignified bearing, and lack of idle curiosity were at once noticeable. In the Government House was an ornamental collection of implements, mostly warlike, and it was matter of deep regret that the late Sir John Thurston, then Governor of the group, was absent and so his great knowledge unavailable. There were several private collections of little scientific value. In Oxford, later, the collection from this group made by Baron von Hügel, probably the choicest in any museum, was examined with the kind assistance of the accomplished collector who is now Curator of the University Museum. Before leaving Suva some kapas (white *masi* and figured *sulas*), and a few implements were purchased which are now in the Museum.

The route of the 'Warrimoo' was direct from Suva to Sydney, leaving New Zealand far to the southward, but on several previous voyages the museums of that progressive Colony were visited, and it may be stated that the Canterbury Museum, Christchurch is, as a general museum, one of the most attractive in the Southern Hemisphere, and in the remains of the Moa (*Dinornis*) unquestionably the richest in the world: in Maori remains it is not remarkable: it publishes a Guide-book. At Wellington, the Capital of New Zealand, and the centre of scientific energy in that Colony, the museum is smaller, but contains a fine carved Maori house. As a scientific museum that at Auckland, of which Mr Thomas F. Cheeseman is Director, ranks high; and here is the fine Maori war-canoe more than eighty feet long and of remarkable model, besides many carved prows and stern-posts of canoes that have perished. The Maori implements are well represented but a depraved taste has led to the mutilation of the native carved figures, hence ethnologically all such specimens are bad for they lead to a false estimate of indigenous art. The blame for this silly proceeding may or may not rest with the Government, certainly not with the accomplished Curator. On the other hand it should be said that all the Colonial Governments have fostered museums of which Australia and New Zealand may well be proud, for as educators of the people, these museums, although so recent, are close followers of Vienna, Berlin, Hamburg, London, Washington, New York and Boston.

At Sydney the Australian Museum in charge of Mr Robert Etheridge, Jr., had been rearranged and greatly improved since a visit two years before. In the Department of Natural History is a

AUSTRALIAN MUSEUM.

nearly complete series of Australian marsupials well mounted, also preparations illustrating marsupial embryology; life-like casts of serpents; remarkable skeletons of fish—among them *Ceratodus*, better than were seen elsewhere; a series of Australian birds, not complete, but excellent so far as it goes; and a very extensive mineralogical collection. In the ethnological hall are many New Ireland carvings, both in wood and in chalk; the best series of large round wooden food bowls, from the Admiralty Islands, seen in any museum; New Guinean masks, nets, shields and spears; the largest series in existence (some forty) of Australian tree carvings, of which the Bishop Museum has a set of photographs; some interesting articles from the Solomon Islands; and a curious lot of relics purchased from the family of Captain James Cook, among these a feather cloak (which will be figured and described elsewhere) and helmet [Pl.I.] both given to the great Navigator by Kalaniopuu. A fine Tahitian gorget of feathers, pearl-shell and shark teeth [Pl.II.], not a few good *kapas*, and some Tongan matting are noteworthy in this purchase. The collection of Australian implements formerly here was destroyed by fire while in the Exhibition Building some years ago. Even this lamentable occurrence has not put an end to the unwise course of loaning valuable specimens from secure museums to flimsy and temporary exhibition booths for popular amusement. As in New Zealand museums there are but four dried Maori heads showing the *moko* or tatuing, so in Australian museums there are few native crania and skeletons,—more are to be found in London.

The Brisbane museum was not visited, owing to the floods that had rendered the roads impassible. Although it is the centre from which articles from British New Guinea should be distributed to other museums, it is said on good authority, that little progress is made in the utilization of these and other rich treasures stored here and useless for all purposes of exhibition or study.

In Melbourne the Ethnological collections are in the Public Library, and although large and including many choice specimens, are not well arranged for study. The Natural History collection is in another and distant building even less suited to the purpose, and so disagreeably crowded that arrangement is almost impossible, and specimens are often mounted in a way unworthy of modern scientific taxidermy.

In Adelaide the museum is in a new and well-planned building of brick and iron, and Dr. E. C. Stirling has on exhibition the largest and most complete collection in the world illustrating Australian life and works. The food products, manufactures* with the raw material in all stages, matters of personal adornment seldom collected, stone implements, are admirably displayed and afford ample instruction—not only to the casual visitor—but to the scientific student as well. This may indeed be taken as a model for all like institutions, and no student of native Australian manners can neglect this encyclopædic series. In the Natural History division the same good system and results prevail. The palæontology of South

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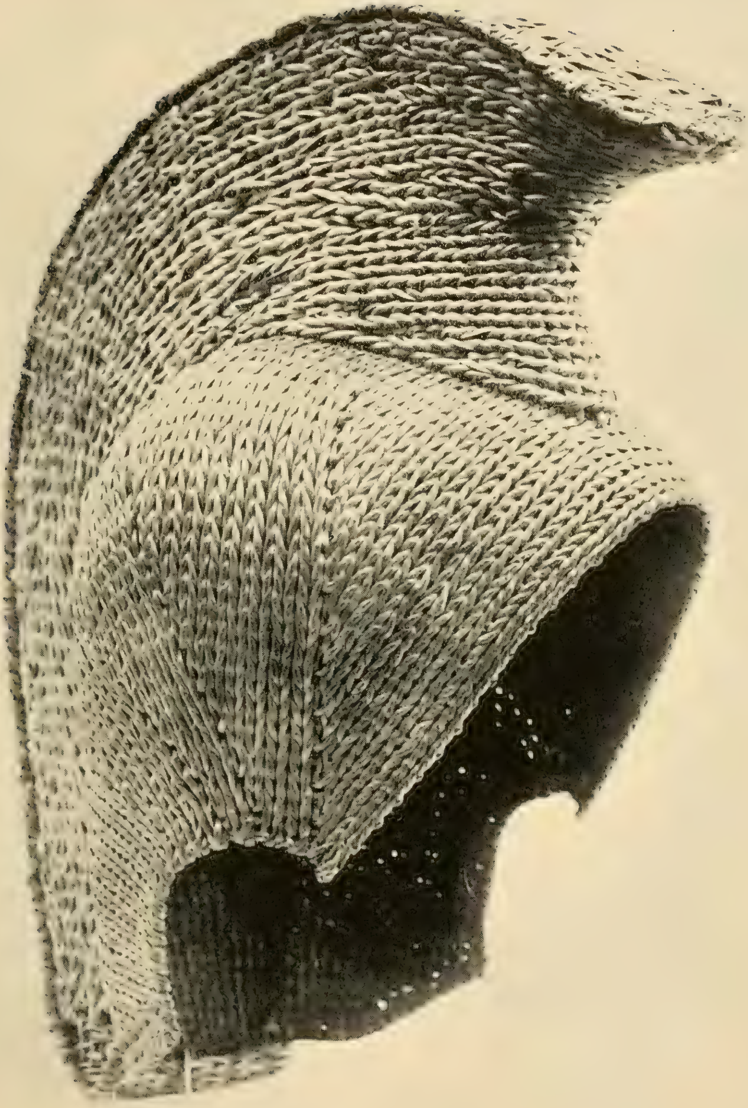
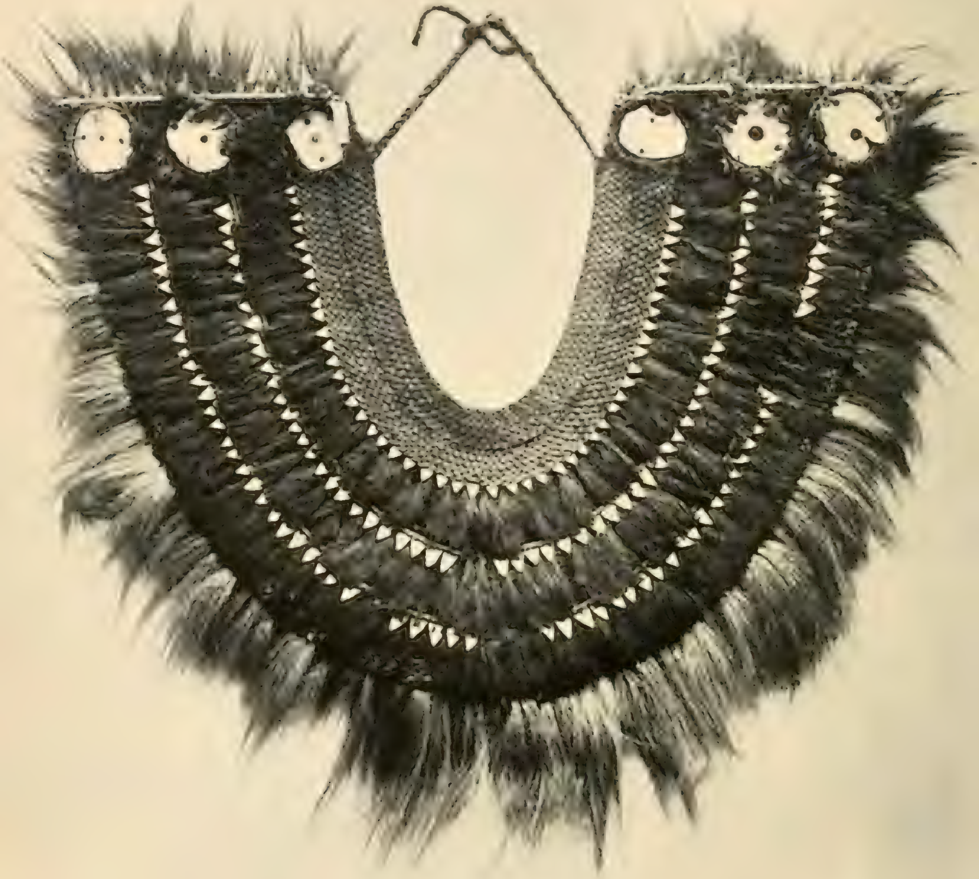
* Note should be made in passing of the capital spear-points, some of large size and admirable workmanship, made from telegraph insulators and soda-water bottles, by the natives of West Australia at the present day. Many examples are shown in this museum.



HAWAIIAN HELMET (COOK COL.).



Tahitian Gorget.

Australia is well represented. It was a matter of deep regret that weeks could not have been spent here in studying the contents of this museum under the guidance of Dr. Stirling. The Botanical Garden, although suffering from the prevailing drought, well repaid a visit. There are not only in the houses many rare plants collected by the late Dr. Schomburgh, but also a capital museum of botanical products. The present Director Mr Maurice Holtze has every thing in perfect order. The "Claw vine" (*Bignonia gracilis*), which covers the walls of the Bishop Museum, here bears fruit although it has not fruited on the Hawaiian Islands.

After a journey of some twelve hundred miles by rail from Sydney to Adelaide, the S. S. 'Orotava' of the Orient Line was boarded in Largs Bay, February 19, 1896. Albany was the last port in Australia and from that the course lay direct to Colombo which was reached March 3rd. Here the museum is a large two-storied building, surrounded by colonnades, near the cinnamon gardens, so enjoying plenty of light and space. The contents, although of great interest, are almost entirely from other regions than the Pacific.

Passing through the Red Sea and the Suez Canal the 'Orotava' arrived at Naples March 18th, late in the afternoon. Here attention was particularly directed to the famous Marine Zoölogical Station established and conducted by Prof. Dr. Anton Dohrn. As at some future time it may be possible for the Trustees of the Bishop Museum to establish a similar institution, it was very desirable to see this the first and greatest. Prof. Dr. Dohrn was most obliging and exhibited and explained the establishment. Here was first seen the admirable result of formaldehyde as a preservative for acalephs, polyps, and similar animal structures: later its effects on human bodies were seen in the laboratory of Prof. Dr. Hans Virchow in Berlin.

Rome was next visited. Here the greatly enlarged Museo Kircheriano in the Collegio Romano has a very large collection of ethnic articles brought together by Government exploring expeditions (voyage of the 'Magenta', etc.) and by the Italian missionaries.

Brazil and the region of the Orinoco are especially well represented and generally America, both North and South, takes the lead. The Pacific Region contributes little of note. From the Hawaiian Islands only a *lei palaoa*, *koi*, *ie kuku*, and some *kapa*. The coarse kapas from Bolivia and the Rio Napo were interesting, and the Mexican feather mosaics and the plumes and feather head-bands from the Chamacocos del Chico boreale were very beautiful. There was a fair New Guinea series, also specimens from Micronesia and Fiji, but nothing not common in other museums. In Florence, owing to the absence of the Curator, during the Easter holidays, none of the local collections were seen. Since this was written Prof. Dr. Giglioli has kindly sent the two valuable papers he has published* describing a number of articles from the Pacific that have been in the Real Museo di Fisica e Storia Naturale at Florence since the end of the last century; many, if not all of them, from Cook's third voyage. When the famous Paolo Mantegazza founded the Museo Nazionale di Antropologia e di Etnologia, the first of its kind in Italy, this neglected and almost forgotten collection became the nucleus of the new museum. In this are the following:—

> 2 Feather capes. 2 Helmets without feathers. A number of kapas. (Dr. Giglioli quotes fully from the Preliminary Catalogue of the Bishop Museum.) 2 Lei palaoa. 2 Tortoise-shell bracelets. Hula drum of coconut wood. 2 *Kupee hoakalakala*. 2 *Kupee niho ilio*. 2 Stone adzes. 6 Fish-hooks. Kou dish with figure for handle; resembles Fig 8. 2 Umeke. *Ihe* or javelins. Dagger, *pahoa*. 2 *Leiomano*. Some good Tongan clubs, baskets, and nets. The remains of one of the rare Tahitian robes of ceremony; and other objects of less importance.

In Vienna was found one of the great museums of Europe. Two palaces separated by an extensive square, in which is the statue of Maria Theresa, contain the public museums; on one side the Art collections, on the other the Ethnology and Natural History. The Ethnological collection, in charge of Dr. Franz Heger, is nobly

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* Apunti intorno ad una Collezione Etnografica fatta durante il terzo viaggio di Cook e conservata sin dalla fine del secolo scorso nel R. Museo di Fisica e Storia Naturale di Firenze. Studio del Prof. Dott. Enrico Hillyer Giglioli. Firenze 1893-95.

AUSTRIAN HOFMUSEUM.

housed and well arranged, and is especially interesting to us as the depositary of many of the things brought from the Pacific by Cook's officers. These Cook relics were bought in London in 1806, by the order of the Emperor Francis II., from the Parkinson and Leverian collections. Sydney Parkinson was artist to Sir Joseph Banks during Cook's first voyage. The original inventories of this purchase were examined but no information of especial interest was obtained. The purchase was only of curiosities for the imperial cabinet.

The principal things in the kaiserlich-königlich naturhistorische Hofmuseum belonging to this region are:—

*Hawaiian Islands.*

Feather helmet, red and yellow, a few feathers left. Pl. III, Fig. 3. Another with green body and red and yellow crest. *ibid.* Fig. 4. Helmet of wicker-work now without feathers. *ibid.* Fig. 5. Feather god, *Kukailimoku*, red with yellow trimmings, dog teeth and shell eyes. Pl. IV, Fig. 6. Pyramidal structure of wicker-work on an oblong base, "a model of a temple oracle", covered with red feathers, the corners ridged with yellow; a door on one of the wide sides cased with tortoise-shell: height 23½ inches. *ibid.* Fig. 7. Hat of European form once covered with feathers, now greatly dilapidated. Feather cape, 35 inches in extreme width, of *iiwi* with a pattern in yellow *oo.* Feather cape, 40 in. wide, of *koae ula*, the upper border black, sides and bottom of cock's feathers, while above all was an open net of *oloná* nearly one third of the depth of the cape. Feather cape of similar shape and size, of mixed feathers, among them a few *oo.* A carved wooden ladle with anthropomorphic handle. Fig. 8. Implement with a single shark tooth fixed in the end of an L-shaped handle, a form not in the Bishop Museum nor known outside a few of the oldest European museums; apparently common at the time of Cook's visit (1778), and used for wood-carving.* Fig. 9. Shark teeth knife. Fig. 10.

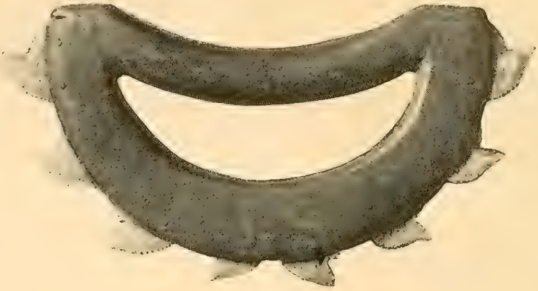

Fig. 11.

Crescent-shaped weapon with eight teeth fastened in with two pegs each, an unusual way. Fig. 11. Tool of *kauila* wood semicircular in form and armed with a single tooth at each end; it could be used as a disk-cutter. In several specimens of this tool seen elsewhere† the teeth are attached at right angles to the position in the present case which is unique, so far as known. Fig. 12. All the preceding implements are from Cook. Human hair necklace, *niho palaoa*, with small niho and few strands. Decorated water-bottle, *Ipu wai pawehe*, 12 inches in diameter. Umeke of wood, flat form. A deep umeke. Umeke with cover. Hula drum 8 in. diameter. Boar tusk armlet, *Kupee niho puaa*, full size, 5 in. Similar armlet with small teeth 1¼ in. Two armlets of wood and bone; one of dog teeth, another of *Strombus* shells. Anklet, 8 in. square, of dog teeth; one of white shells, another of black and white shells. 5 *Ulumaika*, good. 4 stone mirrors, all

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* In older times instead of wood a pig's jaw served for handle.

† See especially the illustration of that in the British Museum.

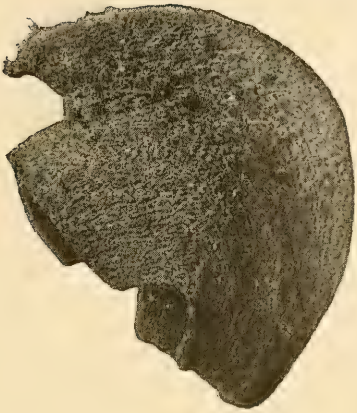

Fig. 3.

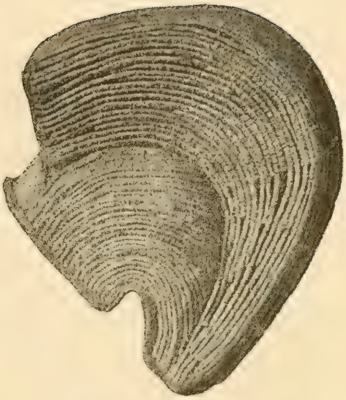

Fig. 5.

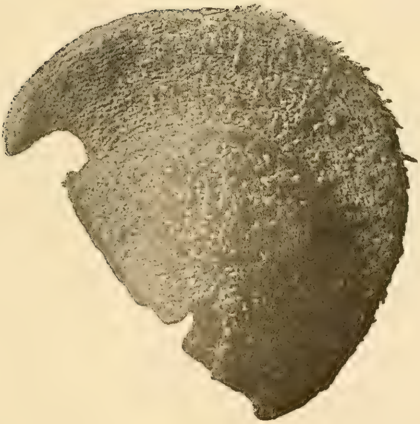

Fig. 4.

HAWAIIAN HELMETS.

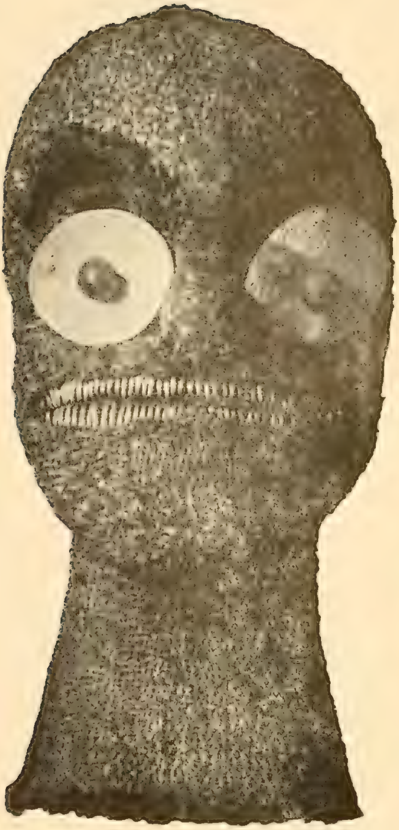

Fig. 6.

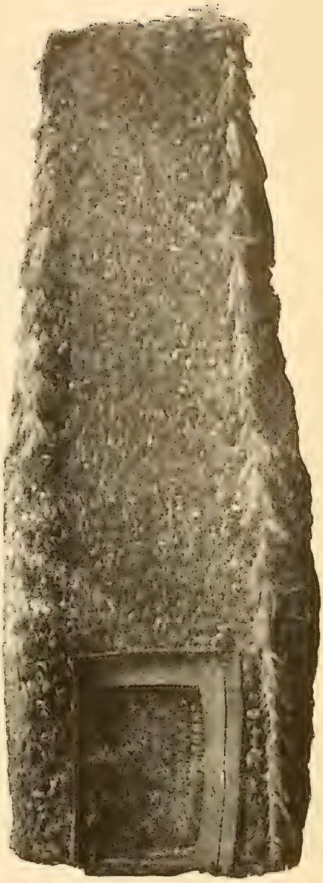

Fig. 7.

HAWAIIAN FEATHER-WORK.

but one with holes drilled near the rim. Adz of indurated coral; one of phonolite, and a second one of the same material with the original handle. Paddle of common form. 2 Mat bags, square. Niihau mat of good quality and several other mats. 4 Daggers with wood handles, sting-ray points, and skin sheaths, are not Hawaiian, but from Micronesia.

*Tongan Islands.*

A number of kapas of most excellent quality and beautiful design. (Cook.) Pan-pipe of unusual form. Fig. 14.

*Society Islands.*

4 Stone pounders, the handles differing in each one. Fig. 13.

*New Zealand.*

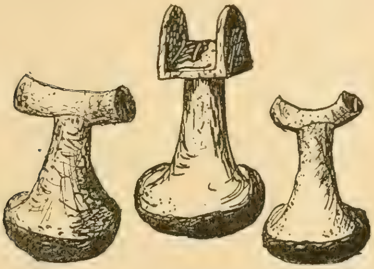

Fig. 13.

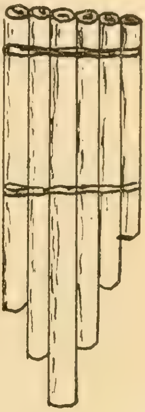

Fig. 14.

Ancient coffin; a hollow log with the end carved in form of a human head: filled with cleaned bones. Pump-drill, the fly of two wooden arms bound by a bark rim. 12 *Heitikis*, some fine, others of unusual form.

*Marquesas Islands.*

Stone idol about the size and form of one in the Bishop Museum. Pestle of stone. 2 Clubs of the flat, carved head pattern found now only in museums. See below under British Museum.

*Rapanui (Easter Island).*

Carved wood polyp or cuttle-fish. Two wood blocks covered with hieroglyphs. Wooden images; 4 lean male, 3 fat male, and 6 female. Talking-stick, old, with very large head: 8 others with human heads, fine. Carved bird of strange form. 3 Obsidian spear or dagger points. 2 Black feather head-bands: 3 of cock's feathers. 2 fish-hooks of bone in two pieces bound together at the base.

*Manihiki (Paumotu Group).*

Paddles of coconut wood inlaid with small pearl-shell disks: this ornamentation being characteristic of this island.

*Hervey Islands.*

Delicate, lace-like mat, the braids resembling human figures. A similar mat was afterwards found in Weber's collection at Berne undoubtedly Tongan. They were used in barter.

*New Guinea.*

Cuirass of *Calamus rotang*. 6 Pan-pipes; one of them with 24, the rest with 13 reeds. 2 Coffins of canoe form with covers. 2 Gourd whistles like the Hawaiian *Ipu hokiokio*, with 3 holes. Spears tipped with cassowary bone were labelled "Lauka".

The feather work from Brazil was chiefly yellow, black, and red, strings of feathers, not on net-work, and greatly resembling the Hawaiian *lei*. Feather sceptres from the Mandurucu were beautiful, but the so-called cloak of Montezuma surpassed them all. This was formerly in the Ambras collection and was figured, *described, and repaired by the late Baron von Hochstetter formerly Director of this museum; and it has since been the subject of much discussion as to its original intention, whether head-dress, ensign, or cloak†; but its form indicates the first. A broad fringe of Quetzal feathers *(Pharomacrus mocinno)* shows its royal character: with these are the wonderful turquoise-blue feathers of the Xiuhtototl *(Cotinga cincta* or *cœrulea)*. A feather fan of the same origin described and figured‡ by Herr Custos Heger is 26¼ inches in diameter and hardly less beautiful. A shield of feather mosaic is also here.

The staff of this museum is large, and the ground-floor contains a village of work and store rooms opening into interior courts. Visitors on public holidays crowd the vast halls to the great discomfort of those who wish to see anything, the throng being so great that the police have to move it in one direction only. Much kind

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[*] Ueber mexikanische Reliquien aus der Zeit Montezuma's in der k.k.Ambraser Sammlung in den Denkschriften der philosophisch-historischen Classe der kaiserlich Akademie der Wissenschaften in Wien, Bd. XXXV (1884).

[†] Zelia Nuttall. Standard or Head-dress? Archæological and Ethnological Papers of the Peabody Museum, Harvard University, Vol. I. No. I.

[‡] Altmexikanische Reliquien aus dem Schloss Ambras in Tirol. [Annalen des k.k.naturhistorischen Hofmuseums, Band VII, Heft 4. Wien 1892.]

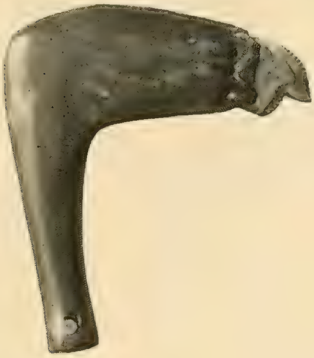
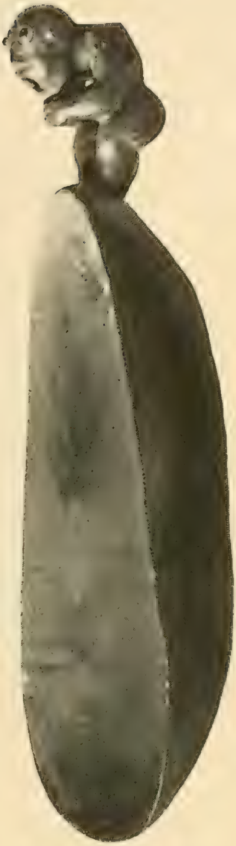


Fig. 9.



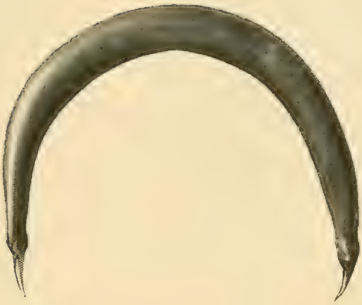


Fig. 12.

Fig. 8.

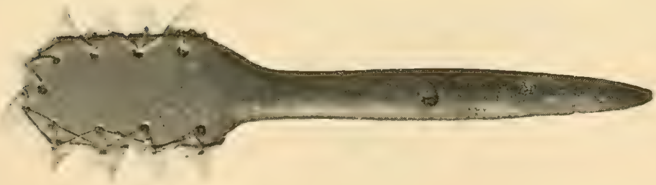


Fig. 10.

HAWAIIAN IMPLEMENTS.

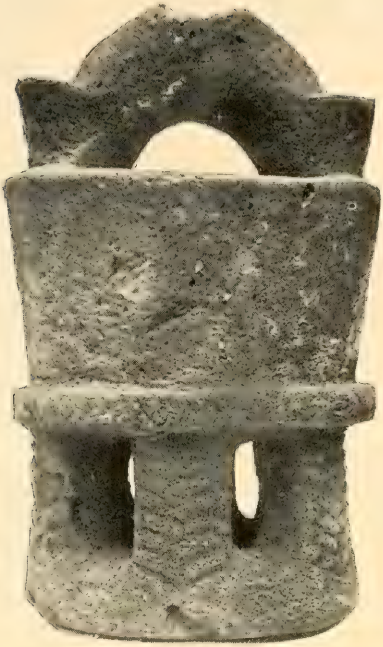


FIG. 60. TAHITIAN SORCERY LAMP.

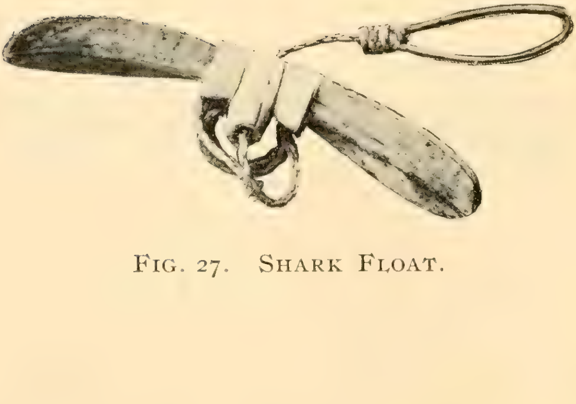


FIG. 27. SHARK FLOAT.

assistance was received from the distinguished Director both in examining specimens and in procuring photographs and plates.

In the museum of Erzherzog Franz Ferdinand, at the time in process of arrangement by Herr Heger for public exhibition in one of the ducal palaces, are many fine things from New Caledonia obtained by H. R. H. the Archduke during a recent cruise in the Pacific Ocean. Among the objects were many spears, arrows, and clubs in piles and not accessible, and the following:—

*New Caledonia.*

2 Death-masks and several carved wood faces for the same. Used at the funeral of a Chief. Many flat disk greenstone clubs with wooden handles and in some a rattle at the hand end. The disks often 8 to 10 inches in diameter and well polished. Fig. 15. Club of common form, but with a curved handle not seen elsewhere, see Fig. 16. A conical implement of greenstone bound with a cord handle. Fig. 17. Jade beads both spherical and cylindrical. Many spears and arrows. 2 Adzes of jade set in a solid head in one piece with the handle. Fig. 18. Many ordinary adzes from New Guinea and the Solomon Islands. Many fine things from eastern Asia.

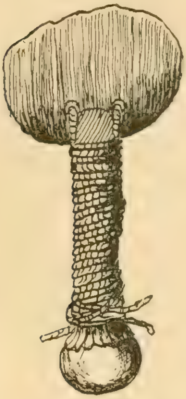


Fig. 15.

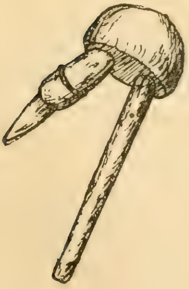


Fig. 18.

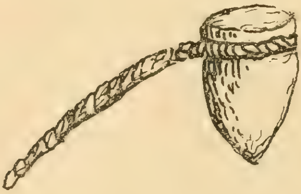


Fig. 17.

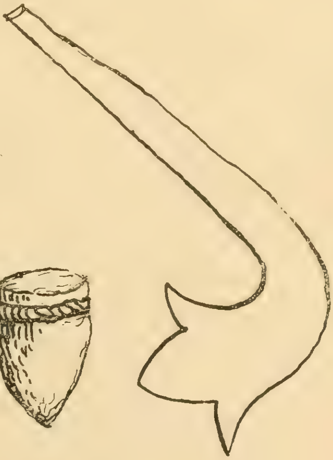


Fig. 16.

In the Natural History Department of the Vienna Museum is a fine series of *Dinornis* bones.

Munich was next visited. Here the königliche ethnologische Museum is in the charge of the well-known scientist and traveler Dr. Max Büchner. The Bavarian capital is famous for its public buildings but many of them are only architectural displays with little capacity or convenience between the walls, and in one of these is housed the Bavarian Ethnological Museum. This is especially rich in Chinese and Japanese material, but there are also not a few good things from the Pacific Region, as follows:—

*Hawaiian Islands.*

Feather helmet, rather small, of the usual red and yellow feathers with a narrow, v-shaped black stripe on the sides. Feather cape of red with a narrow band of yellow *(Oo)*; apparently a fragment. Idol of wood with a crest or *mahiole:* another about 24 in. high but probably of modern make. These figures were given by Dr. Behrends, formerly a resident on Maui. 5 Ulumaika. 2 Poi pounders. 2 *Leiomano* of ordinary 4-tooth form; 2 with one tooth each. Kukui nut candle 15 inches long. *Ipu wai pawehe.* Lei palaoa, small, of bone with a few unbraided strands. Lei of dog teeth. 3 *Pa'u hula*, modern. Anklet of dog teeth, small.

The New Guinea collection is good: in it are several fine long wooden dishes. There are many carved masks from New Guinea and the Bismarck Archipelago; inlaid bowls, etc., from the Solomon Islands; and a Maori *mokoed* head and several carvings. From Matty Island in the Admiralty Group were wood dishes, hatchets, and weapons of peculiar and good workmanship.

The method of making shell-money is clearly shown. The white disks are chipped from *Conus*, the purple from *Cypræa* shells, both by means of an oblong pebble rounded at both ends. Each disk is bored separately by the ordinary pump-drill armed with a quartz splint. Some 200 of these perforated disks are strung on a palm leaf midrib and rolled between flat stones until circular. The arm-rings of *Tridacna* shell are said to be cut with large bambu sections armed with sand. Many articles from New Guinea have, since 1890, been made for export, Dr. Büchner says. The private collection of the painter Gabriel Max is rich in spears, clubs, and stone adzes. There are also five mokoed Maori heads. In the owner's absence, Dr. Büchner showed me this extensive museum.

Zoölogische und anthropologisch-ethnologische Museums zu Dresden. This museum is poorly housed in the upper storey of a long colonnade. To get at it at present one has to go through the Natural History Gallery, up stairs and then down stairs, to cross an archway, and then up stairs again. Under the directorship of Drs. A. B. Meyer and M. Uhle the publications have been many and very valuable, but the arrangement of the museum did not seem convenient for study. In one case were jade articles—Maori heitikis and meres beside Mandarins' balls and New Caledonian beads.

*Micronesia.*

Model of a Marshall Islands *Mede* or chart. Armor suit of coconut fibre with the rare form from the Gilbert Islands; 3 suits of common form. Shark tooth implement from Nawodo quite similar in form to the Hawaiian but distinguishable by a single transverse ridge on the handle. See Fig. 58; upper right hand.

*Fiji.*

12 Throwing clubs; 12 Musket clubs; 4 Knobbed; 1 Pine-apple; 1 Cylindrical*. Model of temple in sennit. 2 War-paddles.

*New Caledonia.*

Greenstone disk club. 2 Death masks. 3 Nephrite clubs.

*New Zealand.*

3 Jade heitikis. 3 Jade *meres*, a very fine one given by Dr. Julius Haast. Kiwi feather cloak. 2 Paddles, common form. 4 *Patu* of carved wood, new. Bone patu. Greenstone patu. Carved slab with three men and two dragons. Cast of an heitiki in the Freiburg museum.

*Marquesas Islands.*

Club of choice old form: see illustration under British Museum.

*Hervey Islands.*

5 Carved paddles from Mangaia. Ceremonial adz, inferior.

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*The Vitian clubs have been classified, for convenience in cataloguing, into these divisions:

| | | |
|---|---|---|
| **Throwing**, | short, slim handles with heavy lobed knobs; native *Ula*. | D Pl. VII. |
| **Knobbed**, | straight body with knobs of the wood or human teeth or bone. | A " |
| **Pine-apple**, | tuberculated top bent at an angle to the stout shaft. | B " |
| **Musket**, | the head flattened and bent like the butt of a gun. | F " |
| **Lotus**, | like the preceding but without the shoulder. | C " |
| **Cylindrical**, | often carved or bound with sennit; sometimes very large. | E " |

These illustrations are taken from specimens in the Bishop Museum.

*Australia.*

7 Zauberholz or bewitching sticks. 22 *Nulla nullas* and *waddies.* 5 *Wommera* or spear-throwing sticks. 13 Shields. 8 Hammers. Small bark canoe. 2 Pump-drills. 6 Breast shells, decorated. Stone knife for *Mika* operation. Boomerangs in great number.

*New Guinea and Bismarck Archipelago.*

Dancing masks, a fine series. Strings of shell money. Money chains. 8 Rattan nooses used by head hunters (Fly River?). 2 Carved figures. Carved drum (S. New Guinea); another with shell rattlers; 3 of common form. Star club with eleven points to the stone star; another with four points. Many and good chalk images from New Ireland. Large series of charms from Hermit Ids., usually a lower human jaw corded, and decorated with feather and stick pendants. 2 Adzes with jade blades. Fig. 19. From New Britain, carved wood images; 2 pump-drills with stick for fly; carved wood figure, life size (8096); 8 Masks of the frontal portion of human crania dressed with gum; 3 lower jaws; Bailer with handle joined to back and bottom. From the Samoan and Solomon Ids. not much of interest: from the Hawaiian Ids. nothing was seen.

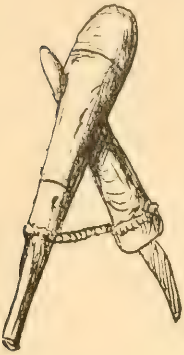
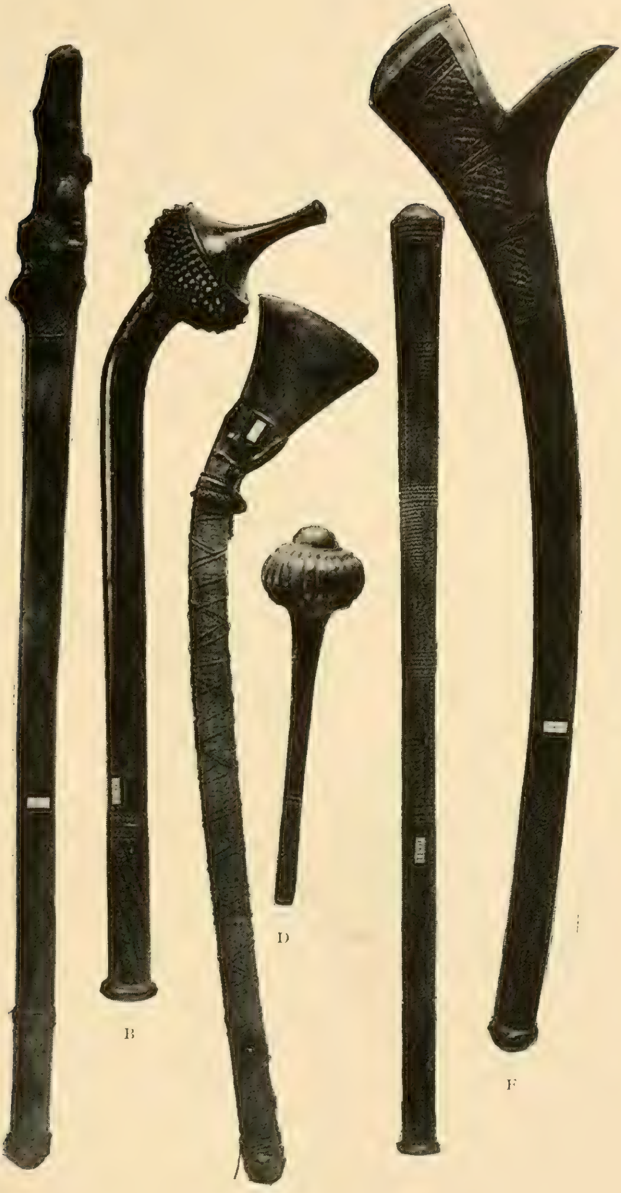
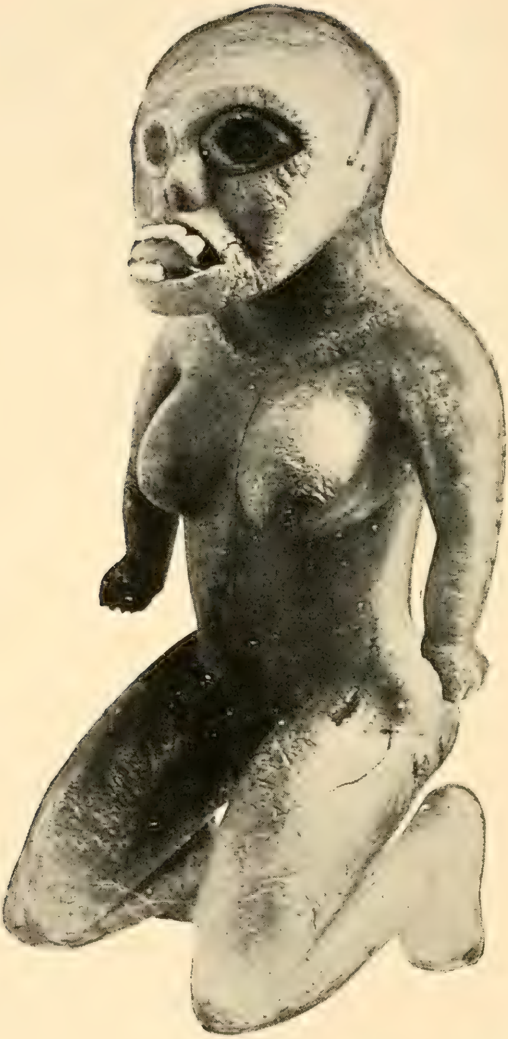


Fig. 19.

Of the Berlin Museum für Völkerkunde Prof. Dr. A. Bastian (who visited these islands some years ago) is the learned Director, and Dr. Felix von Luschan the Curator of the Department of Africa and Polynesia. This, if not the only purely ethnological museum in the world, is certainly the largest, best housed, and organized. The new building is conveniently situated, large, and well-lighted, yet so vigorous is the administration, that it has already become too small for the vast collections within its walls and there are already plans for a considerable extension. The admirable organization of a Director with five Curators of Departments, a fiscal commission to attend to all money matters, artists, volunteer assistants and attendants making a roll of some fifty persons, permits the Director to go on expeditions sometimes lasting two years while the machinery



FIJIAN CLUBS.



IDOL (ARNING COL.).

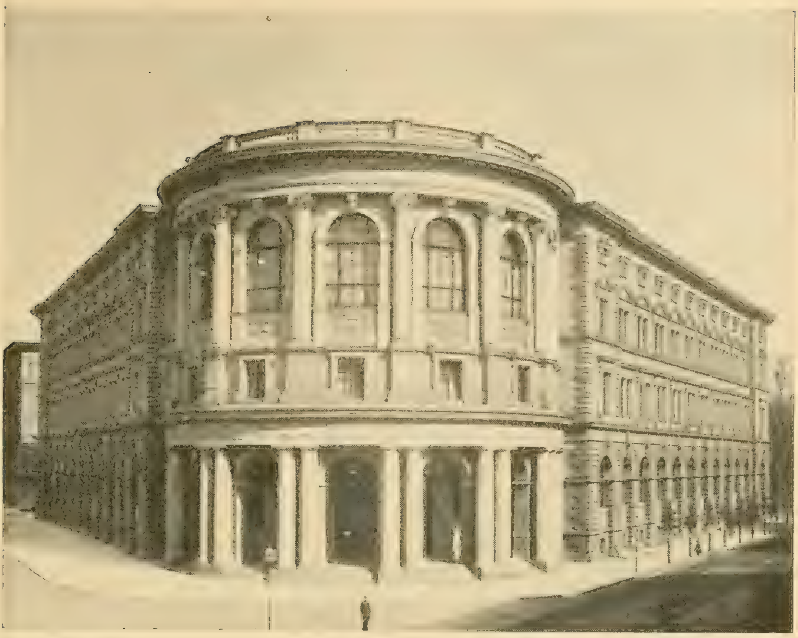


Fig. 20. BERLIN ETHNOLOGICAL MUSEUM.

runs on without disturbance. Besides the necessary Curators' appartments there is a good lecture room where the Berlin Anthropological Society and other scientific bodies hold meetings, several of which it was my privilege to attend. Kaiser Wilhelm II. is personally interested in the museum and, as Berlin is now the scientific centre of Europe, the future growth seems assured. The cases are of iron and glass (many of the shelves also of glass), and although very secure have not an attractive appearance; the mechanism requires two keys to unlock. For detached cases they are suitable, and estimates of their cost were obtained from the makers.

In such an immense collection it will be impossible to notice here matters beyond the Pacific Region, but within that limit tolerably full lists will be given. The Hawaiian, enriched by the collection of Dr. Edward Arning of Hamburg (who is well remembered in Honolulu), has been most carefully catalogued, and the constant kindness of Dr. von Luschan permitted the examination of every article.

*Hawaiian Islands.*

Feather cloak 51 in. long mostly red with yellow crescents. This is displayed on a figure supposed to represent an Hawaiian but this is not a success. Feather cape 16 in. long in middle, 9 in. at the front edge; red ground with yellow border, triangles, and crescents*. Cape 14 in. long, yellow ground and red semicrescents and triangles. Helmet with traces of feathers. Helmet with yellow crest and traces of red and black feathers. Helmet red with black stripe at the base of crest, which is capped with yellow; two stripes on left side. Helmet without feathers but with a crest of five pedunculated disks. Kukailimoku with reddish human hair. 2 Hula drums of gourd. Drum of coconut wood; another with head and more elaborate carving. *Ukeké*, a poor specimen. 3 Bambu time-beaters *(Ohe hula puili)*. Gourd *ipu hokiokio*; another of coconut. 4 Rattles of gourd with feathers; one without. 2 Nose flutes. Coconut drum. 3 Stone cups. 12 Sling stones *(maa)*, good. Kua oloná. Club of rude form with cord attached. Stone weapon of double conical form. 2 Hala pillows. 5 pair of sandals of various material. Hat block of coconut wood. Polishing stones. *Kua kuku* for beating kapa. 23 *Ie kuku* or kapa beaters. 53 *Ohe kapapala* or bambu stamps for printing kapa. 3 *Hohoa* or round kapa beaters. 4 Bambu ruling pens. 2 Koa surf-boards about eight feet long. 4 Paddles without *ihu*. Canoe god with four heads and shell eyes. 3 Squid hooks complete, one with wooden, two with metal points. 5 Hala fish-baskets. 2 *Laau melomelo* or bait sticks. Fish-hook of two pieces of bone bound together at the base; [see Fig. 39.] 2 of ivory, single barb; 3 of pearl-shell; 7 of tortoise-shell. Fishing whip. 2 Shrimp (*opae*) traps. Netting apparatus complete. Wood shark hook with bone point. Idol of wood with hair carved in form of a wig. Image kneeling (Dr. Arning), the only one known from Hawaii in this odd position†. Pl. VIII. Idol, small, unfinished. 2 Idols of rough tree stems. Image of

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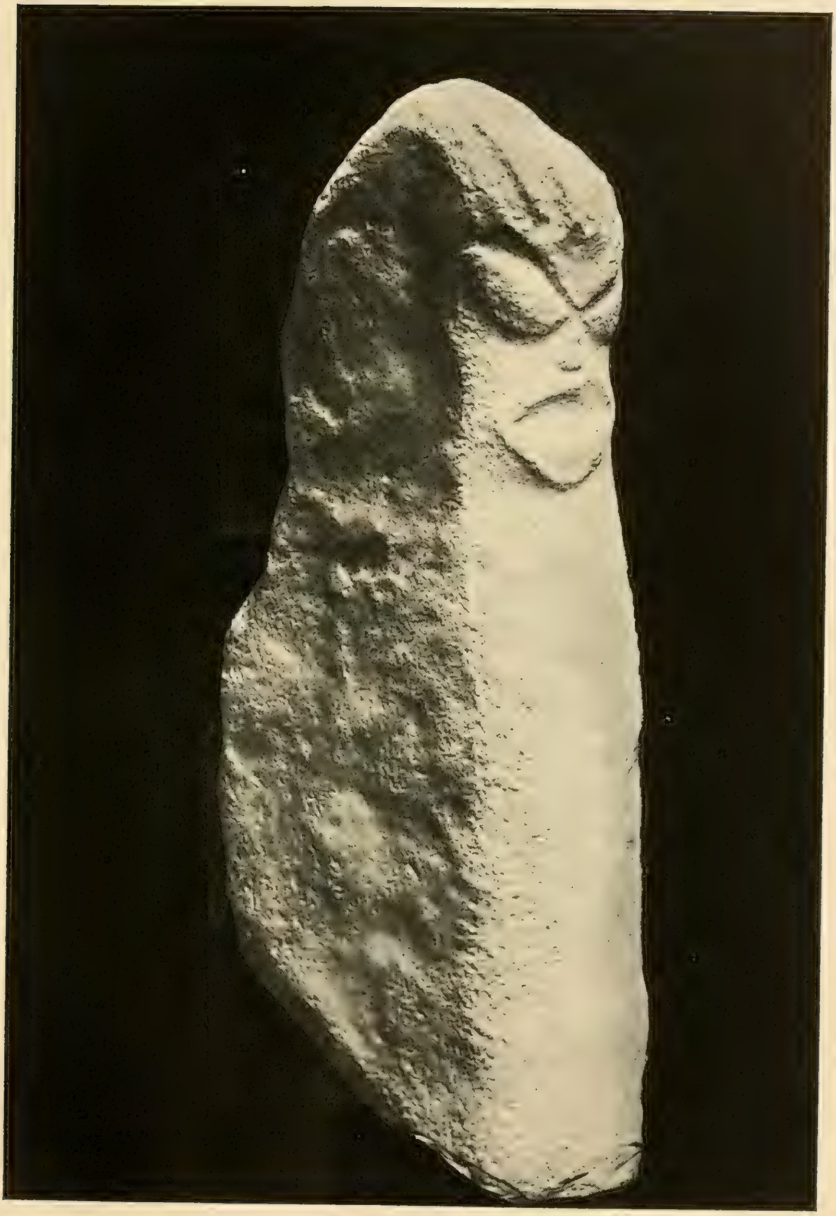
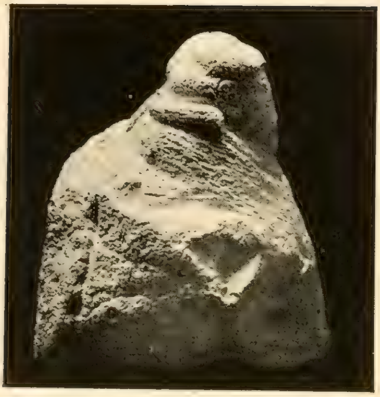
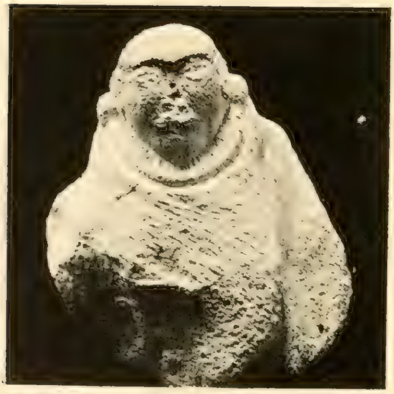
* Hawaiian feather work is briefly noticed in this Report as full descriptions and illustrations will be published in another form.

† The late king Kalakaua considered this figure a representation of Papa the first woman of Hawaiian mythology, but was at a loss to explain the posture; it must be remembered that, like Eve, Papa did not behave with perfect propriety and this may record her repentance, although we are not assured that Adam's disobedient wife ever repented.



IDOL: FORMERLY AT KAHUKU, OAHU.





HAWAIIAN IMAGE: FROM MANOA, OAHU.

bread-fruit, without arms or legs, the long and slim body stuck full of pegs of coconut wood. 4 Idols of carved wood, small. 3 Rude stone idols. Idol of lava melted over coral rock*. Idol of lava rudely carved. Large stone *membrum virile*. 2 Stone figures† formerly at Kahuku, Oahu: one represents a European, (Spanish?) and was anciently in Manoa Valley; the other is an ordinary idol. Pls. IX.& X. Curious wooden figure with white pig bristles arranged like a shoe-brush on the head. Sample of oloná netting for feather-work. 3 Wooden dishes for roast pig. Fish dish 15 inches long, handles at the ends. Umeke, round; one hexagonal, well made; one large, flat; another long, flat. *Ipu holoi lima* of unusual shape. Fig. 21. 2 *Ipu aina*. 4 *Ipu kuha* (spit-boxes). 7 Decorated water-bottles, fine. Umeke *pawehe*. *Huewai pueo pawehe*, small. [Same form is found in Cambodia.] Huewai pueo small, plain. 5 *Koko niu*, of commoners. 6 *Koko puupuu*, mostly of oloná or *waoke* and niu. 3 *Auamo* or bearing-sticks. *Ipu hanohano* gourd syringe. *Ihe pahe* 42 in. long. Ihe pahe short and thick, with cord. Slender stick labelled 'Ihe pahe'? Bow 6 ft. long with ends cut for string: not Hawaiian although a similar bow in the British Museum is so attributed. Leiomano with six shark teeth fastened in with pegs. Implement with one shark tooth fastened with three cords; one fastened with two cords. 5 Pandanus fans, common form. 3 *Kauila* wood implements for carving. Fig. 22. 2 Boards for making pa'u and malo. Cleaner for pa'u boards, fine, but broken at the ends. 22 *Koi pahoa* and 21 fragments of stone adzes. 9 Koi pahoa of small size. 4 Koi pahoa with handles. Stone chisel, fine. Iron adz with handle. 2 Grindstones, small. 12 Stone lamps. Fig. 23. Stone club. Stone pestle. 6 Long strings of kukui nuts for candles. 8 Niho palaoa; one with coarse braid; another with twisted hair and small niho. 3 Lei of bone beads, some spiral. Kupee niho ilio. Lei *mokihana*. Lei of *Abutilon* capsules; 3 of *Coix lachryma*; 1 of

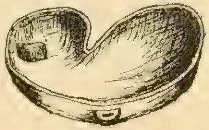


Fig. 21.

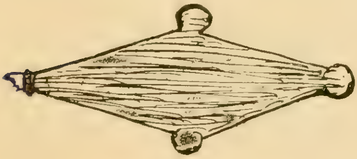


Fig. 22.

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* The Hawaiians delighted in making *aumakuas* of unusual forms or combinations.

† By the kindness of Dr. Bastian this Museum has received good casts of both figures.

*Abrus precatorius*; 1 of kukui nuts cut polyhedral; 1 of dog's teeth; 1 of red and white *Pecten* valves; 1 of Niihau shells; 1 of these shells and *Erythrina* seeds. 9 Bone bosses for armlets. Tatauing instruments and stone cup for ink. 4 Stone mirrors, some with holes drilled. Bone comb. 2 Cup and Ball, one with kapa, the other with coconut ball. 15 Ulumaika, ordinary. 8 Ulumaika, rough. 6 Rounded stones for cooking. 6 Models of grass houses. Bow and Arrows for mice, newly made. 2 *Pohaku puka kui poi.* 8 Poi pounders, common form; another of coral rock. *Pohaku kui noni.* 2 *Laau lomilomi.* 3 *Holua* runners. *Pololu* of usual form; another with barbs. Large stone Canoe-breaker bound with cord. Kauila wedge with cord for canoe building. Koa canoe about 15 ± ft. long, with *wiliwili* outrigger strengthened by wood cleats on each side: *ama* sewed on and its ends sewed with stitches alike on both sides. 2 Teetotums of kukui nut. Many specimens of modern straw braid. Awa root. Kapas of common kinds.

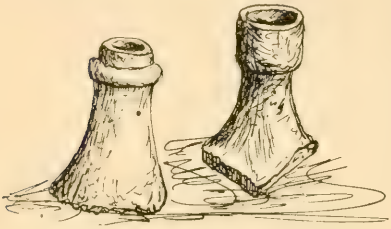

Fig. 23.

*New Caledonia.*

17 Clubs of the usual forms. 6 Stone clubs; 1 of jade; another of great size. 21 Clubs bird-head shape. 11 Star clubs of wood. 29 Spears. 30 Arrows. 6 Slings with pouches and stones. 3 Arrows for fish, 3–4 prongs. 2 Bows of wood; 14 of bambu decorated. 2 Bird arrows with blunt heads. 5 Adzes mounted. 7 Cord dresses, common; 6 white; 4 of leaf. 6 Death masks. Ladder pole with projecting bosses. 6 Large figures carved on flat slabs. 3 Paddles, heart-shaped blades. 3 House models. 6 Pandanus fans like Hawaiian but with rounded corners. Pot for suspension; 1 26 ± in. high; 2 smaller ones. 3 House models. 3 Poles strung with *Triton* shells. 4 Carved human figures. 3 Canoe models. 3 Carved slabs [shields?]. 2 Bailers. 3 Double strings of round jade beads. 2 Pump-drills. 4 Bambu combs quarter segment. 5 Braid-covered calabashes. 6 Baskets. 5 Basket bags. 3 Beaters of round wood. 2 Hatchets of wood with large white blades.

*New Zealand.*

2 Dried human heads with moko. Canoe prow of ancient form.

Stern post of canoe very narrow. Modeled figure with cloak of flax, heitiki, staff and mere. 3 *Pare* or door-caps, large and fairly carved. 2 Carved kumete for feathers, etc. Side post of door. 4 *Tikis*, one a female with lizard. Carved funnel for feeding a Chief while undergoing moko. Portion of carved canoe prow. Grindstone, large. 2 Jade heitikis. Jade earring. 2 Hammer stones. 9 Jade adzes. 33 Greenstone adzes. 2 Greenstone meres. 2 Meres of wood, plain; 7 carved. 3 Jade meres; 1 of carved bone; 6 of plain bone. 2 Clubs, carved. 2 Flax pounders of stone. 4 Carved wood walking sticks. Tata of medium size. Model of canoe. 3 Paddles, plain; 3 carved. 12 *Taiaha* or Chief's staff. 6 *Tewhatewha* or Battle axes.

*Rapanui (Easter Island).*

3 Human figures, one remarkably fine. 9 Images of inferior quality. 4 Lizards. 2 *Moi*. 2 'Talking-sticks' of ordinary form and size; another very old, showing the human head. Fig. 24, A–B. Stone head. 6 Head-rings of feathers. 7 Obsidian lance-heads; another mounted on a long staff. 3 Large stone adzes. 3 Curiously carved paddles with groove at small end for attaching the awkward handle. 2 Crescent-shaped gorgets.

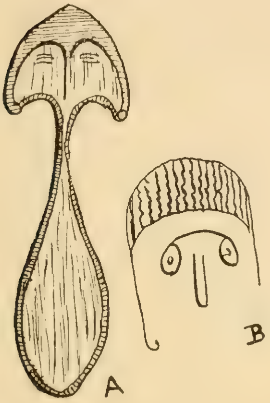

Fig. 24.

*Samoan Islands.*

7 Canoe models. 2 Gongs of wood, trough-form, 60 in. long, 61 in. girth. 2 Grindstones. Fans galore. Awa bowl of peculiar tripod form. Fig. 25. 7 Small awa bowls. 3 Combs. 5 Kapa beaters. 3 *Upete* for printing kapa. 6 Stone adzes with handles; 55 without. 26 War clubs of various but not unusual forms.

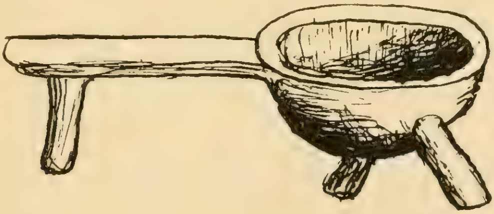

Fig. 25.

2 Throwing clubs. 4 Carved spears. 2 Shell bands. 7 Awa cups of coconut shell. 3 Pandanus mats fine texture; several coarser. 2 *Ali* or bambu pillows. 2 Bed mats of white *Hibiscus* fibre. Upete of wood. Round basket, good workmanship. Mat long and narrow for the game of *Lafoga* which is played by casting *tupe* or circular pieces of coconut shell. The mat is from 15 to 20 feet long and less than a foot wide.

*Society Islands.*

6 Fish-hooks of wood and bone; 2 of bone with tortoise-shell barb and back. 2 Poi pounders. 3 Stone adzes mounted; 4 without handles. 5 Adzes of shell mounted. 2 Gorgets like that shown on Plate II. Ornament of pearl-shell plates. Drum 7 in. diameter, tall, with braids of sennit to tighten the head. 2 Drums of wood similar to the Hawaiian. Bailer. Fan (See Pl. XIII).

*Tongan Islands.*

18 Combs of usual form. Pillow of wood. 2 Pan pipes. Belt of human hair (Samoan?). 5 Stone adzes and another mounted. 2 Baskets of dark material, one long the other round. Upete for printing kapa. 2 Spears barbed. Club carved; 4 plain clubs.

*Marquesas Islands.*

4 Clubs finely carved. 2 Stilt-rests. 2 *Triton* shell trumpets. Pearl shell with tortoise-shell ornament.

*Hervey Islands.*

3 Paddles carved, rosette handles; 3 with square, flat, handles; all from Mangaia.

*Paumotu Islands.*

2 Canoe models, double, inlaid with pearl-shell: Manihiki. Curious wooden pillow. Kapa beater 2 in. square, 2 ft. long; another 3 in. square, 15 in. long.

*Fiji.*

27 Common forms of pottery. 21 Clubs musket form, 3 decorated with shells; 18 throwing; 10 round; 14 knobbed; 6 pine-apple, one very small. 11 Spears finely carved. 2 War-paddles, Paddle with shovel blade: 4 others carved. 2 Carved lances, short and barbed. 3 Kapa beaters, one handle carved. 3 Wood shark hooks. Head covering of netted rushes tipped with feathers. 5 Ornaments of whale teeth; 2 more with the teeth halved. 4 Necklaces of cachelot teeth; 3 with filed teeth. Many fringe dresses. 4 Yaqona bowls. Oval yaqona bowl on four legs. 5 Fans mostly of whole palm leaves. Oil dish with carved sup-

port; another semicircular. 3 Cannibal forks. Carved wooden spoon. Turtle bone scoop. 2 Food hooks of odd forms. Many kapa *sulas*. Human figure 30 in. high, carved wood, round face. 4 Wooden pillows.

*Micronesia.*

Chisels of *Mitra* shell. Daggers of bambu. Stool of wood inlaid with bone. Helmet of coconut braid conical in form 15 in. high. 3 Round, carved, wood boxes. 6 Carved wood figures. Fire plow quite like the Hawaiian. 2 Rasps of wood covered with sunfish skin. House model from Kusaie (Finsch 1883). Shell tripod dish. Bundles of preserved food and many of the common shell ornaments, belts, earrings, etc.

*Hermit Islands.*

2 Wooden food troughs; one 8½ ft., the other 6 ± ft. long, with well carved internal handles. Large flat dish of dark wood. 2 Bailers with handle attached to the bottom. 6 Carved canoe prows, one quite large. 15 Human lower jaw amulets. 4 Canoe models. 12 Wood pins beautifully carved. 2 Carved wood fishes. 2 Wooden dishes with handles and obtuse ends; 6 similar ones but with carved, pointed, ends. 4 Wooden bowls, two of them small and like those from the Admiralty Group. 5 Shell adzes. Fig. 26. 2 Wooden ladles with human figures. Carved adz-handle (Maori form). Kapas coarse and slightly beaten. 7 Combs; three of them with bearded human heads. Fish hooks of single piece of shell, decorated, but of rough finish and without barbs.

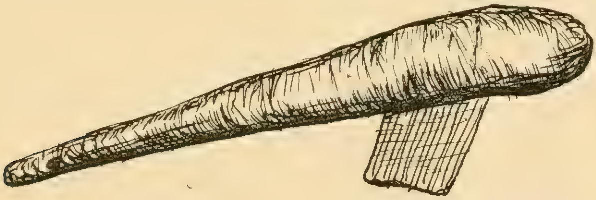

Fig. 26.

*Admiralty Islands.*

45 Obsidian head lances. 10 Gourd decorated lime boxes, hourglass shape. 3 Wooden bowls carved in form of birds; 2 smaller ones of same form but light wood. Globular bowls red pottery. Wooden bowl on four legs; a smaller one with carved handles.

3 Bailers the ends of handles phallic*. Cylindrical wood gong 3 ft. long, slit lengthwise, projecting handles at the ends, carved decorations over the handles: Fig. 37 shows the form. 4 Oval wooden bowls; 2 similar with finely carved handles. Bead belt with 14 strands. Canoe model outriggered. 5 Lances carved. 8 Obsidian daggers. 8 Daggers carved, sting-ray points. Adz of obsidian. Large wooden food bowl. 5 Ladles with carved handles. 3 Obsidian axes, one with carved handle.

*New Hebrides.*

2 Large human figures of rushes (?) with skulls or frontal bones, painted. 6 Knobbed (star) clubs of dark wood. 4 Spears with single point and carved head; 4 with many barbs carved; 3 with many points of sting-ray. 13 Bows. 6 Clubs spindle pattern. Arrows with bluish points. Net pig-catcher. 3 Pan pipes with 6, 7, and 17 reeds. Carved oval wooden bowl 20 inches long. 2 Long basket-work cones with seed capsule rattles at the apex. Small rush figure with extended arms and fingers. 2 Decorated caps for festivals. 4 Earthen pots; 2 of them from Santo.

*Solomon Islands.*

9 Clubs covered with fern stem braid. 11 Paddle-clubs of dark wood; 15 of light wood. 5 Longiels. 4 Dance longiels. 5 Arm guards of coiled vine. 35 Stone axes. 2 Shields of wood, 2 of reeds, and 1 braided, plain. 12 Carved canoe figures. 20 Carved dance figures. 18 Dance paddles, common; 12 with carved tops. Pump-drill with cylindrical fly. 2 War belts. Arrows galore. Canoe model inlaid. 2 Women's dresses of white cord. 2 Carved wood human images with turban-like head ornaments. Club of flat, rhomboidal form. 2 Masks inlaid. 4 Earthen pots. 18 Bows. 7 Canoe-heads inlaid with pearl-shell. Food bowl inlaid, family size; another smaller. Human figure on frame. 2 Human heads carved on a base. Double-headed human figure inlaid. Braided comb. 3 Large wooden mortars from Shortland Island, the largest 30 in. high exclusive of ground peg. 3 Bunches of white *Helix* shells used as rattles. 7 Decorated coconut and bambu water-bottles. 9 Woven baskets or bags. 18 Stone adzes. 9 Baskets of rattan, 2 with handles. 8 Hair-pins with human figure carved on the top. 13 Lime boxes of bambu decorated. 19 Lime-boxes of gourd engraved. Large pan-pipe—

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* The handles of old Maori *tatas* or bailers are often phallic.

less than 30 in.— with 12 reeds. More than fifty red and yellow woven armlets of artistic patterns.

*New Guinea & Bismarck Archipelago.*

An immense collection impossible to enumerate here. It is perhaps the best in any museum, as one would expect from the very extensive interests of the German Government in this region. Of the more remarkable objects are the following:—

11 Shields, heavy, carved wood. 10 Shields similar but rectangular. 8 Decorated shields of wood curved horizontally; 14 similar but curved vertically. 2 Wooden shields from Friedrich Wilhelm's Land. 7 Carved wood shields with arm notch at top. 3 Hour-glass shields covered with braided rattan. 10 Stone disk clubs. Stone star club. Club with triangular stone head. 6 Knobbed clubs. 2 Pump-drills. 6 Carved wood pillows. 11 Stone adzes mounted. 14 Drums with lizard skin heads and flat bases; 2 similar with mitre-shaped bases. 2 Pan-pipes with 24 reeds from New Hanover; 2 similar pipes from the same locality with 20 and 21 reeds each. From New Ireland, 12 Masks of human frontal bones; 25 Stone ball clubs; War gong, a hollow cylinder 49 in. long and 69 in. in circumference, with a longitudinal slit two inches wide; 27 Chisel-like adzes of greenstone; 21 Chalk images, some of great size*. 2 Wood floats for shark fishing. Fig. 27, Pl. VI. Wooden fiddle from New Britain. Fig. 28. 6 Shell collars flat on the fibre, same locality. 2 Mummies of children † from Torres Strait. 7 Tortoise-shell masks, same locality. Triton trumpet. Dukduk costume. 7 Matrimonial nut signals. 8 Wooden clubs, cones at both ends. 26 Small greenstone adzes. Bags decorated with *Coix* seeds. Slings like Hawaiian, Kaiser Wilhelm Land. Pan-pipes with 9 reeds, lower ends fibre bound. Lime boxes of gourd and coconut shell. Shell crescents, Etc.

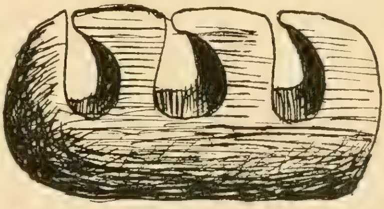

Fig. 28.

Nationalmuseet den Ethnografiske Samling Kjobenhavn.

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* In these images the abnormal developement of a certain part is not entirely native, but arises from a desire to secure a market with foreign sailors and traders.

† This seems a favorite disposal of the dead on Darnley Island and elsewhere in this region. They are not very well mummyfied and without additional preparation will not keep.

From Berlin the route was via Warnemunde and Gjedser to Copenhagen. During the winter the museum is opened only one day each week and, unfortunately, this day was selected by H.R.H.the Duke of York and party, as well as by your Director, to visit the collections: hence it happened that the accomplished Curator was not available, and, although he said he would send an attendant to open the cases, the contents had to be examined through glass,—the only time this occured after leaving Rome. This was the first museum where a printed catalogue was found and, although this was in Danish, it was not difficult to interpret with the numbered objects before one. In the Hawaiian case were several things not belonging to this Group, among them a poi pounder ( of gypsum ) from Micronesia: while a fine ring pounder *(pohaku puka)* of undoubted Hawaiian origin was found in the Mexican division labelled"Corn grinder". It should be said that there is a very similar Mexican stone implement used for that purpose. The following were noteworthy:—

*Hawaiian Islands.*

Feather cloak 57½ in. long, red with yellow border at base and yellow triangles at edges, but so hung that the back is invisible. Feather cape of yellow with dark green crescents and red spots on neck and edges; fine specimen. Cape red with yellow ornaments; slightly smaller than the last but both were too far behind the glass to be measured. Helmet in fair condition. Pair *Kupee ilio.* 2 Kahilis with bone and tortoise-shell handles 6 ft. long 2 Ulumaika. Stone mirror ½ in. thick labelled "Maika". 7 Stone adzes, one of largest size: 2 more with handles. 3 Lei niho palaoa. 2 Pohaku kui poi common form, 1 Pohaku puka. 2 Pa'u boards. Cleaner for these boards. Fig. 29. 5 Kapa beaters. 6 Ohe kapalapala, one with *ea* stamp. Another had a very unusual pattern, see Fig. 30. on next page about double size. 3 Huewai pawehe. Umeke, small. String of kukui nuts for candle. 3 *Kupee* of bone or whale tooth and one of pipipi shells *(Nerita polita).*

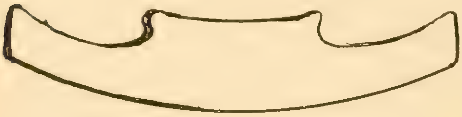

Fig. 29

4 Fish hooks of pearl-shell and ea. 2 Triton shell trumpets. Implement of *Kauila* wood with a shark tooth at each end for engraving or carving. Fig. 32. [Compare Fig. 22. page 17.] Idol, rude carving, about 3 ft. high and 3 in. diameter. Koko puupuu. 6 Kapas of good quality. 3 Kapas of very modern pattern, one with bunches of red and black leaves, another with "palms". Fig. 31.

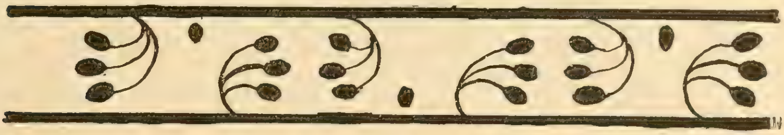

Fig. 30.

*Marquesas Islands.*

3 Stilt rests, poor carving. 2 Clubs, good. Group of two figures 12 inches high carved in wood united by the back of their heads, the middle wrapped in white kapa. 2 Paddles.

*Hervey Islands.*

6 Carved paddles. 7 Ceremonial adzes, 2 quite small; Mangaia.

*Society Islands.*

4 Wooden bowls, long and pointed, the longest 40 in., carved on the rim. Wooden pillow 40 in. long, with 4 legs. 5 Stone adzes, one of them mounted. Large kapa beater. Stone chisel. Kapas stamped with fern leaves in red. Tatuing comb and rod beater. Wooden box or gong 43 in. long. Wooden seat dish-form. Human hair girdle (Samoan?).

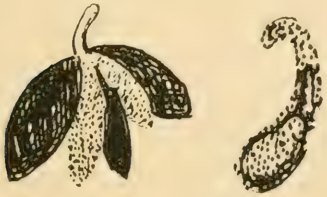

Fig. 31.

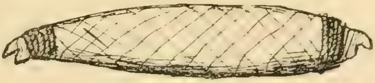

Fig. 32.

*Samoan Islands.*

Kava bowl. 14 *Siapo* (kapa), ordinary patterns. Upete, small. 10 Stone adzes, one mounted. White hibiscus fibre mat. Red mat. 2 Nautilus shell frontlets. 3 Combs. 3 Fans. 2 Spears. 4 Fish hooks with braided lines. 2 Clubs, narrow.

*Rapanui.*

7 Obsidian lance heads. Figure carved in wood. 2 Clubs with uman heads. Feather head-rings.

*New Caledonia.*

3 Bird-bill clubs. 14 Knob clubs. 4 Adzes with short handles. Fig. 33. Death mask in fragments. 2 Sling pouches. 15 Sling stones. 1 Sling cord. Jade and wood club or axe. Fig. 34.

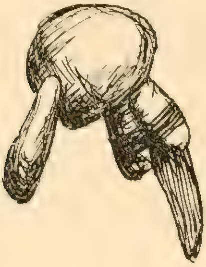

Fig. 33.

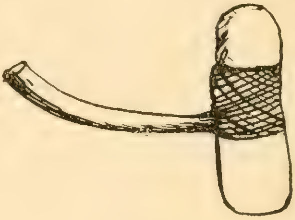

Fig. 34.

Jade disk club. Human figure in wood life size; another, small *(membrum virile longum)*. Wooden baby in box. Carved male figure well done. Carved demon (?) 24 in. high.

*Fiji.*

15 Stone adzes. 3 Adzes with handles. Shell adze (Micronesian or Samoan). 2 Yaqona bowls. 6 Pots of common form. Pottery bowl. 2 Pottery jars of unusual form. Wooden bowl 15 ± in. diameter. Oil dish on stand. Cannibal fork. 2 Fans. Food-hook. Tatuing tools. 2 Whale tooth ornaments. Necklace of cachelot teeth; another of filed teeth. Common pillow. 2 Carved wood pillows. 13 Clubs musket form; 4 pine-apple; 7 knobbed; 10 round; 14 throwing. 6 War-paddles. 5 Spears carved. House model. 3 Kapa beaters. Upete of wood 60 in. long, 12 wide. Canoe model. Fish spear. 3 Human figures (fern stem ?) with whale teeth ornaments. 4 Shell necklaces; another of human teeth (cannibal trophy ? ). Satchel, long.

*New Zealand.*

Dried human head mokoed ( Et tatoveret Mandshoved ). Tiki 50 in. high, usual three fingers. 2 Carved house slabs. Carved covered kumete 26 in. long. 4 Mere of bone; 5 of greenstone; 2 of wood, plain; 1 of carved wood. 29 Greenstone adzes; 12 of jade. 3 Trumpets, carved wood, 15 in. long. 2 bone flutes, modern. Tiki of two men one above the other. Taiaha. Flax pounder of stone. Canoe model ( Krigskano ). Tewhatewha Cape of flax ( *Phormium* ). 6 Heitikis of jade. 5 Jade earrings and fragments. 2 Cloaks of flax. Small old kumete. 3 Fish-hooks bone and shell. 2 Shark hooks. War-canoe prow.

*Tongan Islands.*

Awa bowl 31 in. in diameter. 11 Carved clubs. 2 Bambu fish spears. Wood pillow, usual form. Sling, well made.

*New Hebrides.*

6 Spindle-form clubs. 5 Knobbed clubs. Carved figure, painted. Other common things.

*Solomon Islands.*

Bows and arrows galore. Carved figure. 2 Human figures in wood. Arm coil. Plaited shield. 4 Longiels. 2 Paddles. 6 Dance clubs. Spears many, some with cassowary bone tips. 5 Combs. 3 Carved bowls, fine. *Tindalo* or ring god. 3 Adzes. 2 Canoe ends decked with *Ovulum* shells. Pan pipe. 3 Belts of shell beads. 2 Shell disk frontlets with tortoise-shell carvings. 2 Plain shell disks.

*New Ireland.*

5 Male human figures in chalk.

*New Britain.*

7 Masks. 2 Slings. 3 Paddles and the common carved figures.

*Admiralty Islands.*

2 Human figures. 7 Obsidian head lances. Obsidian dagger with well-carved human figure for handle; a fine specimen. 2 Lime boxes of gourd. Bailer for canoe. Penis cover, engraved shell of *Ovulum ovum*.

From Copenhagen via Korsör and Kiel to Hamburg. The Völkerkunde Museum is on the upper floor of the Natural History Museum, a large building well fitted and arranged. Herren C. W. Luders and Hagen have charge of the Ethnological collections.

Eastern Asia claims the larger portion: the arrangement of the Polynesian portion is rather incomplete and confusing, and although there is insufficient room several loan collections are crowded in. A part of the Godeffroy Museum has here found a home, another part was found in the shop of the dealer Umlauff. Herr Luders was very obliging in pointing out what was of most interest to his visitor, and his residence in the Pacific has made him familiar with many matters concerning that region, so there were fewer mistakes in identification than usual in European museums.

*Hawaiian Islands.*

2 Huewai pawehe. 4 Adzes in fragmentary condition. Model of a double canoe. The figure called Hawaiian in the printed catalogue has brass earrings and was perhaps made by a sailor.

*Hervey Islands.*

4 Ceremonial adzes; and 4 Paddles, all from Mangaia.

*Rapanui.*

4 Human figures. Bird well carved. Talking stick or paddle. Club. 2 Rude stone human heads. 4 Obsidian lance-heads. Wooden crescent-shaped gorget.

*Marquesas Islands.*

Crown of carved bone, tortoise-shell and feathers. 3 Stilt-rests. Beards of old men. 3 Spears. Fan. Club.

*Niüe or Savage Island.*

Longiel. 3 Paddles.

*Samoan Islands.*

Small fishing canoe. Hibiscus fibre white mat. 2 Hook clubs. 15 Siapos, ordinary patterns. 13 Fans. 5 Spears. 2 Baskets. 2 *Fue* or fly-flaps. 3 Shell frontlets. Tatuing implements. 4 Serrate clubs. Other clubs of doubtful origin. House model. 5 *Ali*, common form. 2 Wooden bowls, one 80 in. long, 27 wide, of doubtful origin.

*Tongan Islands.*

Gypsum poi pounder. 2 Wood pillows. 3 Squid bait, fragments of *Cypræa tigris* fastened to a stone sinker (Tahitian ?).

*Manihiki.*

Paddle inlaid with circles of pearl shell. Club, 2 Bowls and a box inlaid in the same characteristic manner.

*Fiji.*

6 Human skeletons male; 2 female. 6 Crania. These in the Natural History Museum. 24 Throwing clubs; 6 pine-apple; 7 knobbed; 10 round; 10 musket form. Tree stem with human bones imbedded; — a cannibal trophy. 3 Cannibal dishes. Oil dishes (2). Roll for marking kapa. 3 Kapa beaters. 3 Wood pillows. 7 Yaqona bowls. Long, round pillow. 2 Pillows flat-topped. 16 Pots, common forms. 3 Heads of hair or wool. 2

Chiefs' staves. 4 Satchels, flat. 14 Carved spears. Model of temple in sennit.

*New Caledonia.*

Death mask in poor condition, 2 Adzes with handles. 2 Bird-bill clubs. 2 Clubs, round. 2 Bambu combs. Small human figure. 3 Water bottles. Cylindrical woven head-dress or cap. Dresses galore.

*Caroline Islands.*

6 Oblong wooden bowls. 2 Wooden boxes with covers. Canoe model. 2 Shark floats. 7 Decorated canoe sticks. 3 Decorated house beams (used to hang clothes upon). 3 Coral rock pounders. Wooden gong with handles at the ends. Fig. 35. 7 Belts.

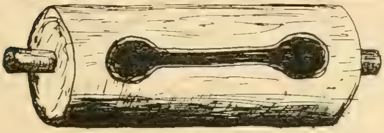

Fig. 35.

*Tols* in great number. Nukuor figure in wood 66 inches high. 4 Smaller figures from the same locality. Ponapean flat kapa beater. Tortoise-shell dishes and spoons. Tatuing implements. Hat used in reef-fishing. Sling stones. Common mats. Large boat-shaped idol, curious. Tortoise bone hoe. 20 Packages of *Tiké*. Comb with feathers.

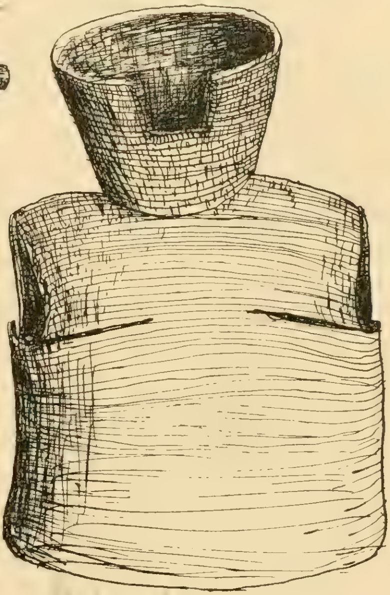

Fig. 36.

*Gilbert Islands.*

3 Suits of coconut fibre armor. Another suit with an erect collar like the one at Berlin. Fig. 36. 3 Trousers of fibre with shirt attached. Sun-fish belt. Glove armed with shark teeth. Cord dresses. 12 Shark teeth swords. Models of canoes. Mats of hau and pandanus. 3 Stalactite fish-hooks; 4 Common fish-hooks.

*Marshall Islands.*

2 Drums. 3 Canoe models. Stone adze with an unusual knob

on the handle. Fig. 37.

*Bismarck Archipelago.*

Many masks. 11 Human frontal bone masks. Large chalk figure and 19 smaller ones. 11 Stone ball clubs. Many swords and flat clubs. 5 Good carvings from New Britain. Group of *Buceros* ( Horn-bill ) delivering a woman — this bird being the Lucina of New Ireland.

*New Guinea.*

Curved wooden shield. Heavy round shield. 5 Dukduk hats.

*Solomon Islands.*

Shield finely inlaid with squares of pearl-shell. 7 Carved canoe-figures. Canoe model. Small food bowl. 7 Dance-paddles, of common form, and 3 with carved handles. 2 Clubs covered with plaited *Gleichenia.* Shell disk frontlet with tortoise-shell "thunderbolt".

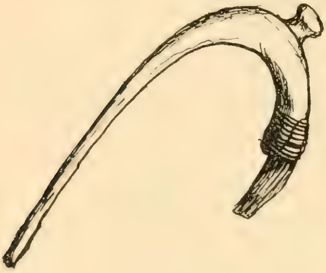

Fig. 37.

*New Hebrides.*

Human figures and a large lot of clubs of ordinary forms.

*Hermit or Anachorite Islands.*

3 Long, pointed wooden bowls. 2 Shell adzes. 4 Frontal bone masks. Wooden fiddle ( New Britain ).

*Torres Straits Islands.*

Tortoise-shell masks, good. 3 Carved pillows. 2 Disk clubs. Star club. 3 Drums.

*Admiralty Islands.* 9 Obsidian head lances.

The printed catalogue of this museum is simply a list of numbers, names, and localities without farther information.

The next city visited was Amsterdam. Here the museum is on the upper floor of a large building in the Zoologische Garten. India and the Dutch East Indies are very well represented while there is but little from the Pacific Ocean.

*Hawaiian Islands.*

Lei palaoa. Huewai pawehe. Bone fish-hook. Fig. 38, Pl. VI.

*New Zealand.*

Greenstone mere and adze with handle. 2 Jade heitikis. Human face from an old Maori carving.

*Marquesas Islands.*

A pair of stilt-rests and a fine club.

*Fiji.*

Human figure in wood. 17 Spears well carved. 5 Clubs, musket form; 5 knobbed; 5 throwing; 2 pine-apple; 2 round.

*Hervey Islands.*

5 Ceremonial adzes and a carved paddle.

*New Guinea & Bismarck Archipelago.*

An assortment of bags and 10 *Korowaar* from the former and 3 carved figures from New Ireland.

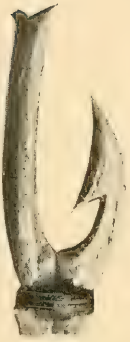

Fig. 38.

In the same Zoölogical Garden, which is conveniently situated in the midst of the city, and one of the best kept in Europe, is the Aquarium. This is very well planned both for exhibition and for the care of the tanks. The contents were not of great rarity but in perfect condition. The obliging keeper showed all the inner arrangements. There are large underground cisterns for the sea-water which was brought from the Atlantic some years ago. In the hall over the tank room is a collection of marine animals and products neither well lighted nor installed.

In the attic of another building there is a large series of vertebrate skeletons including many Cetaceans. This is not open to the public as it is not yet encased. In the Aviary was a *Dacelo gigas* ( Laughing Jackass ) from Australia. *Pastor tristis* from Java proved to be the same bird as the so-called "Mina" introduced by the late Dr. Hillebrand: *Eulabes javanica* the true Mina in the same house was a capital talker.

Leiden on May 5th. At the Egyptian Museum the distinguished Curator Dr. P. A. A. Booser showed and explained many most interesting matters, his collection being one of the oldest and most extensive in Europe and prized by all Egyptologists. Leiden seems a very small place — almost a town of one street — but besides being a university town, it is emphatically a city of museums. These are all quite too large for the buildings that try to contain them. In one place was a good series of casts from the excavations at Olympia; near the University a Japanese Museum and another devoted to Natural History which contains an astonishing number of animals. Although the Curators were most obliging, there was not time to examine farther; but among the birds was a very old specimen of *Drepanis pacifica* much faded. At quite the other end of the town is the Ethnological Museum of which Herr J. D. E. Schmeltz, the well-known ethnologist, is Curator.* This is in a sadly crowded condition, the rich collections in constant danger from fire, and a large part quite inaccessible to the public. It is naturally strongest in articles from the Dutch colonies and there it is most instructive. From the Pacific Region the following articles were noticed:—

*Hawaiian Islands.*

Feather cloak of *iiwi* with triangles of *oo*.† Feather cape with a narrow border of *iiwi* and *oo* feathers in alternate triangles on the sides and neck, the feathers much worn " des Zahn der Zeit " or of something else, the body of the cape covered with the long green-black feathers of the Frigate-bird. Also figured *loc. cit.* Taf. VII. Oval dish of carved wood with two kneeling figures as supports; the head of one of the figures is hollowed as for salt, and both have shell inlaid eyes. Plate X. 2 Swords of kauila wood set with shark teeth. Huewai pawehe. Netting-needle.

*Samoan Islands.*

2 White fibre mats. *Arca* shells for cleaning bark. Baskets, Fans, etc. 2 Upete. 2 Kapa beaters. Kapas, common forms.

*New Zealand.*

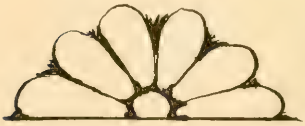

Fig. 39.

Dried head with moko. Canoe model. Tiki with engraved pearl-shell eyes. Fig. 39. Tata figured in the *Archiv* Bd. I., Taf. VII. 2 Mere of greenstone. 3 Kumete, carved, common form; 1 well carved with male and female figures: *loc.cit.* Taf. VIII., 4. 2 Taiaha. 2 Patu of carved wood. 2 Stone adzes with handles. 2 Tewhatewha without feathers. Kauri gum head ⅔ life size.

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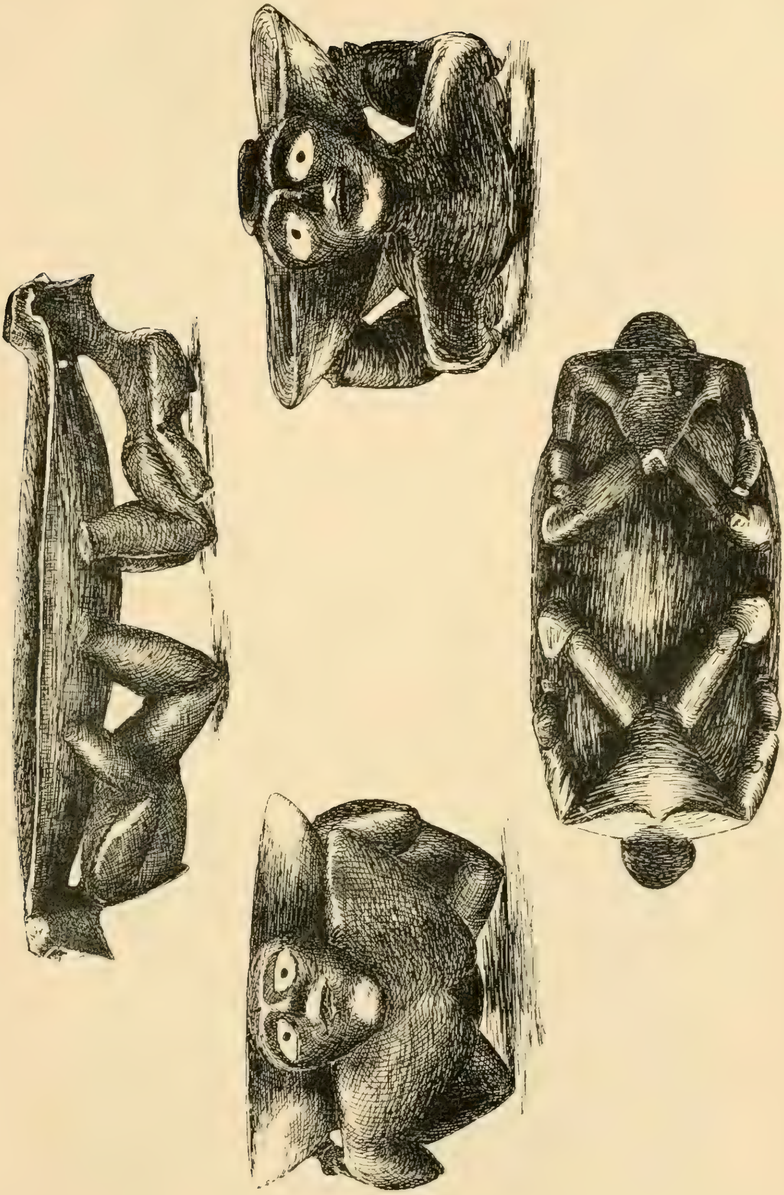
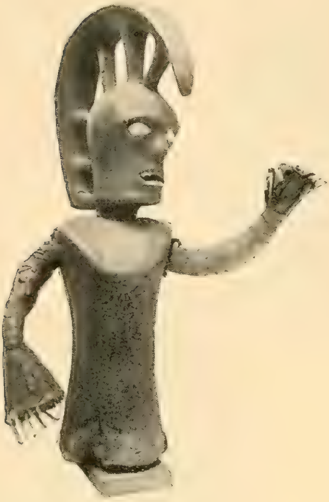
* September 16, 1897, by royal decree, Herr Schmeltz was appointed Director of this National Museum.

† This has been figured in the *Internationales Archiv für Ethnographie* Bd. I. Taf. VIII., but the plate gives perhaps its original, certainly not its present condition, for it is much torn.



HAWAIIAN DISH AT LEIDEN.



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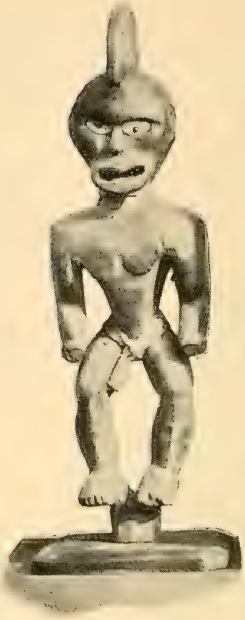

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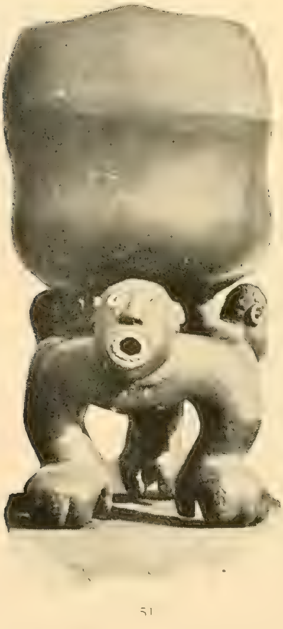

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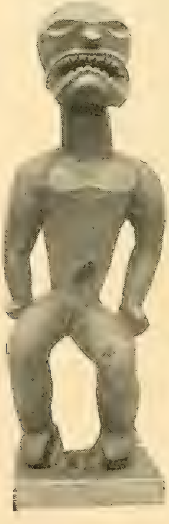

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HAWAIIAN IMAGES.

*Hervey Islands.*

2 Carved paddles more than six feet long; 2 of common size. 8 Ceremonial adzes.

*Marquesas Islands.*

6 Stilt-rests of fine quality. 2 Stilt-rests with double figures attached back to back, unique. 2 Paddles. Paddle with twist at the end. Fine club of large size.

*Fiji.*

Club inlaid with five human molar teeth. Club curiously carved. 30 Clubs usual forms and quality. 7 Carved spears. Lali or gong of good size and finish. Cannibal fork. Human figure carved in wood. 2 Wigs.

*Admiralty Islands.*

Wooden dish or box. 2 Obsidian lance-heads.

*New Ireland.*

Carved figures and masks in great number. 7 Masks of human frontal bones. 12± Chalk images.

*New Guinea.*

Fine human figure. 2 Shields, hour-glass form. 2 Shields of heavy wood, round; another curved. Many elaborately carved *Korowaars*. Pillows, Drums,—and in short a very large collection impossible to catalogue in the few hours available owing to its very crowded condition.

*New Caledonia.*

Death mask. 3 Disk clubs and many of bird-bill and knob form.

*Solomon Islands.*

Small carved and inlaid food bowl. 2 Clubs *Gleichenia* covered. Shield inlaid with pearl-shell squares but much dilapidated.

At the last moment attention was called to a fine carved Tongan club (figured in the *Archiv* Bd. I. Taf. VII.); Tongan carved rest; large drums and a wood fiddle from New Ireland. No doubt many other things escaped notice in this great collection.

At Brussels vain search was made for a feather cape said to be in the Municipal Museum.

Berne was the home of Wäber ( *anglicè* Webber ), the artist of Cook's third voyage, and to the museum of his native town were bequeathed the many articles he brought home from the Pacific

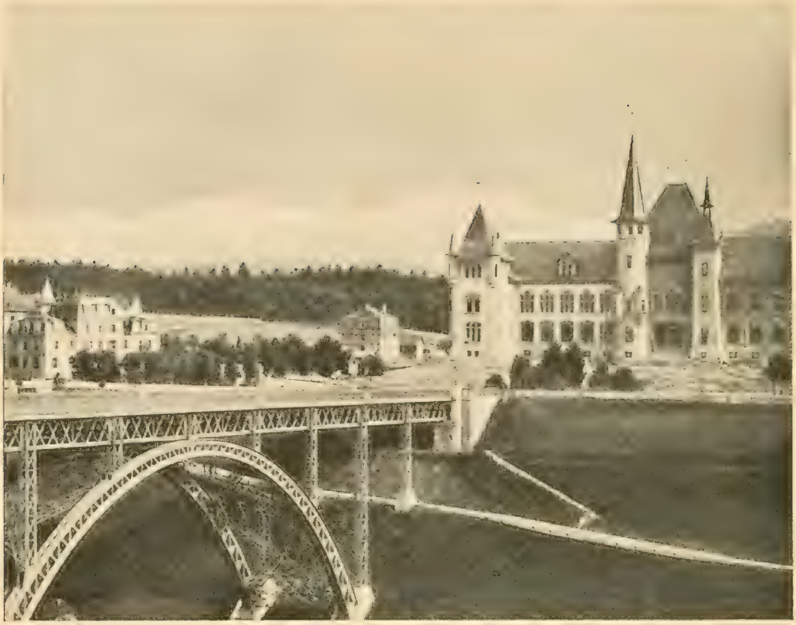

Fig. 40. Berne Museum.

Region. These have been better preserved than the *spolia* brought by other members of the expedition and are now in the fine building of the Berne Municipal Museum. With these relics are exhibited a miniature and an oil painting of the artist. Like all specimens from the "South Seas" in early days Wäber's have either originally or in the course of time been sadly mislabelled.

*Hawaiian Islands.*

Feather cloak about 60 inches long of *iiwi* ornamented with triangular figures of *oo* feathers. It was in fair condition sealed in a glass case within the exhibition case. It was impossible to examine it. Feather helmet of ordinary form red with yellow crest. 2 Feather *leis*, red, black, and yellow. Ulumaika of white stone. 5 Shark hooks with bone tips. 2 Niho palaoa much decayed; the smaller of bone (?). Kupee of bone and tortoise-shell; another of boar tusks (fragment). 2 Anklets of network covered with white shells. Dagger of kauila slim and flattish. Lei of

30 fine *Carelia* shells (labelled "Society Islands"). Knife of kauila with one shark tooth. Niihau mat figured but much faded. Knife of kauila with 6 teeth; through the handle a square braid of *oloná* cord. Tortoise-shell rings with one shark tooth neatly rivetted to the junction of the flat bands; a murderous weapon used as a leiomano. Not known elsewhere. Maa or sling of braided fibre cords and a closely plaited cap. 3 Kapas fine white; another chocolate and brown. Coconut cup.

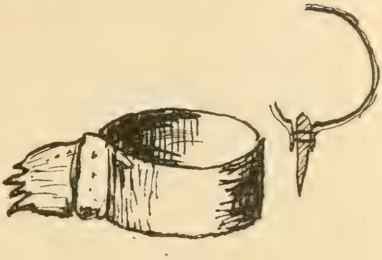
Fig. 41.

*Society Islands.*

Cylindrical corded drum, probably Tongan. Wooden spatula. Tatuing implements. Sunshades of fibre. Fig. 42. Gorget of the usual Tahitian form (See the fine example shown in Pl.II.). Adz attached to handle by braid of hau fibre. Fig. 43. Adz handle without stone. Adz of much smaller size, but complete. Bambu flute ringed with braid, decorated with human figures. (Tongan ?) Network about 44 × 8 inches, fine with red and green figures. Mat woven black and red with fringed edges. Fly-flap with bone handle. Breast ornament of strips of pearl-shell: six rows of varying width. Necklace of black seeds alternating with white shell disks. Satchel with flap cover. Pearl-shell ornaments probably the remains of a breast-plate.

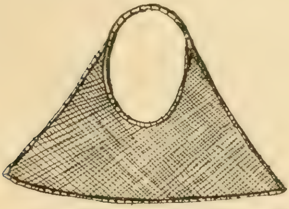
Fig. 42.

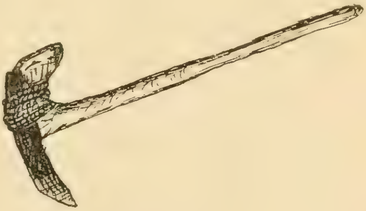
Fig. 43.

*Tongan Islands.*

Curious basket with white shell disks (a few are black) at all junctions of the brown and black triangles forming the pattern of the plaiting as shown in Fig. 66, Pl.XVI. Carved club of fine workmanship, human figures. 2 Plaited satchels. Pan-pipe with 10 irregular reeds. Braided cloak with fringe. Plaited cape with border resembling Maori work. Two mat capes with braided fringe. 2 Kapas with brown figures and white border resembling the Samoan. Long strings of bird bones. Fine pandanus mat from Wäber. Necklace of the rims of *Patella* shells on twisted cord. Wooden pillow of a form intended to keep the sleeper to his proper place on the common mat. Fig. 44, Pl. XVII. Oblong basket, black plaiting with brown decorations. 3 Long strings of dark brown shells. Square basket of unusual weaving. Openwork mats of curious pattern. Fig. 45.

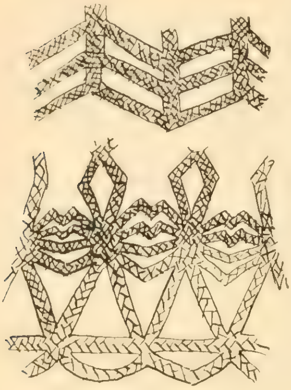

Fig. 45.

*New Zealand.*

Greenstone mere. 2 Greenstone adzes. 3 Ear pendants of the same material. 3 Bone needles. Stone used for breaking an enemy's canoe. Fig. 46. Fish-hook.

*Fiji.*

Three carved spears. 3 Clubs; musket form; 3 knobbed; 1 throwing. Whale tooth ornament. 2 Necklaces, one with 9, the other with 29 cachelot teeth. War paddle. 4 Stone adzes. 2 Adzes short and with handles. Bambu pillow [Samoan ?]. 2 Spoons of turtle bone. Net with stone sinkers and wood floats. 2 Pillows of wood, common form.

*Solomon Islands.*

Canoe figures. Club covered with braid and labelled "Chief's club, Samoa".

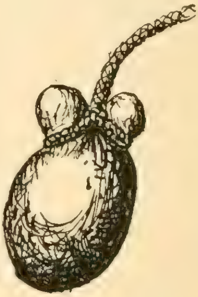

Fig. 46.

*New Caledonia.*

Club of wood with stellate head. 2 Clubs, bird-bill form, small. 2 Clubs common knobbed form. 2 Fringe dresses. Braid covered calabashes. Fan. Sling and 5 sling-stones.

*Rarotongan* show adz. *Samoan* canoe model.

So many specimens were incorrectly labelled that it was impossible to include everything in this list, but all of importance have, it is believed, been noticed. The landscape beauties of this region, the river fed by glaciers, the ápple orchard in full blossom, and the snowy peaks of the Jungfrau range rendered competition hard even in the case of so interesting a museum. Dr. Ed. von Fellenberg, the Curator was absent, but he has since kindly sent to me a biographical sketch of Wäber.

Next in order came Paris the home of Broca and once the chief dwelling place of Anthropology and Ethnology. Paris is still rich in the material with which these two sciences are illustrated and studied, but unfortunately for your director the time was not propitious for his visit. At the Jardin des Plantes the collections were being removed to a new building and at the Trocadero the division of Océanie was not yet in order for public inspection in spite of the efforts of the distinguished Director M. Hamy. The first collection visited was that installed in an attic of the Palace of the Louvre,—the Musée de Marine. Here everything is utterly without scientific arrangement, and the rich treasures are scattered here and there, sometimes arranged in rosettes on the ceiling where they cannot be studied, or as trophies on the walls where military, domestic and musical instruments are grouped together for effect, and equally useless to the student. Without an opera glass one could not examine those on the ceilng, so they are left out of the following enumeration If all the choice articles from the Pacific scattered simply as curiosities through the Parisian museums could be brought together in one properly arranged building it would indeed be a rare collection demanding the repectful attention of every ethnologist.

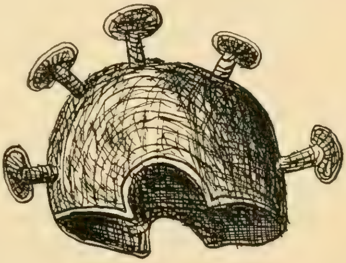

Fig. 47.

*Hawaiian Islands.*

Helmet with five knobs on the partly detached crest (Guimard). Fig. 47. 2 Common helmets, featherless. 2 Helmets with elaborate crests, cup with red feathers, top of crest yellow (Legoarand.) Bambu ruling pen for kapa marking.

*Marquesas Islands.*

Carved wooden bar 10 ft. 2 in. long, used to hang clothes on in the house. 2 Fans with carved handles. Helmet of black hair. Crown of bone, tortoise-shell and pearl-shell well carved or engraved, the bone apparently human. [Similar ones are in the Bishop Museum.] Pair of good stilt-rests attached to poles for use. Box in red and black. Idol about 12 inches high and 1 inch wide. Figure tatued and dressed. 4 rude stilt-rests.

*Tongan Islands.*

Wooden pillow of usual form. 3 Kava bowls. Gong like Vitian *lalo*. Models of houses. Carved food dish with a long handle at one end.

*Society Islands.*

Fine drum. Yellow kapa with red imprints of actual fern leaves, a common Tahitian form.

*Gambier Islands.*

A long cylindrical gong (Astrolabe).

*Easter Island (Rapanui).*

2 Small male figures, one with the head turned to one side, an unusual treatment.

*New Zealand.*

Canoe prow. Bailer. Canoe model, good. 2 Wooden whistles. Cloak of Kiwi feathers. Greenstone adze about 15 inches long of fine workmanship (the largest seen in any museum). Model of house. 3 Heitikis. Jade earring.

*New Caledonia.*

2 Short adzes with handles. [Like Fig. 33.]

*Fiji.*

Magnificent spear about 15 feet long carved and banded with sennit: a series of barbs the lowest 6 inches in diameter. Many clubs of pineapple and other forms.

*New Hebrides.*

Fine tree-drum with human (?) head. The only one seen in any museum, and this rare specimen was in a dark corner. Relief maps of Tahiti and Vanikoro. Models of many canoes made by Europeans mostly and of little ethnological value.

In the Trocadero the room devoted to Océanie was not open to the public, but from Dr. Hamy it was ascertained that there was little or nothing from the Hawaiian Islands, but a good collection from the Marquesas. From Alaska were stone pounders closely resembling the common Hawaiian and also the Tahitian poi pounders: while from Mexico were corn crushers quite like the ring pounders *(pohaku puka)* of Kauai.

At the Jardin des Plantes there were indications of waning interest or appropriations, or perhaps both. A great point has been made of casts or models of various races, but most of these had been removed from the ancient galleries,—the Hottentot Venus being left almost alone in her glory. Replicas of most of these were seen in the next museum visited. There were many crania and skeletons, indeed a choice collection if the labels can be trusted. From the Hawaiian Islands there remained a Lei palaoa and other specimens of human hair. From New Zealand were 5 dried heads with moko. In the Musée de Botanique was a poor specimen of *Argyroziphium* (Silver-sword). Paintings and models of tropical fruits were of great interest and value. In the immense Herbarium are the choice collections of Jules Rémy from Hawaii, and many specimens from other parts of the Pacific, but there was no time to enter this rich field.

At the Hotel des Invalides in rather a dark apartment was the Galerie Ethnographique of the Musée d'Artillerie. Here were replicas of the models of the Jardin des Plantes, the following being the more noticeable ones:

20, 21 New Caledonian colored and dressed.
22, 23 Australian.
25 Admiralty Islander.
27 Solomon Islander.
32 Caroline Islander with coconut armor of the Gilbert Islands and a Vitian spear. The catalogue notes the figure as the gift of M. Ballieu, French Consul at Honolulu, and it will be remembered that it was this gentleman who sent to France the interesting idol discovered in a cave on Hawaii. This idol I could not find. [Probably in the Trocadero.]
37 Hawaiian with feather helmet of common form in black and yellow feathers, leis and cloak the feathers of the last too far

> gone to clearly demark the pattern in red and yellow. The figure is tatued in checks and in one hand holds a Tahitian spear, in the other a ceremonial carved adze from Mangaia, Hervey Islands. A mat malo from some other locality covers his loins. The following is a translation of the catalogue description: "When the Hawaiian Islands were discovered there was found there a sovereign enjoying all the prerogatives and surrounded by the etiquette which belongs to royalty. He had a guard clothed with sumptuous mantles of feathers of great value. Our figure wears one of these mantles of which the foundation made of cord has a feather at each knot. These feathers are taken from a little bird colored red, yellow and black belonging to the Souimanga [Honey-suckers] family, and it can be seen how many of these birds were required to make the mantle. Another strange thing is that the king's guards wear a helmet recalling the Greek casques. The Musée du Louvre contains some very curious ones: ours is covered, as we learn from our explorers, with a feather stuff like that of tne mantles. These warriors had the body tatued in checks of square, triangular or lozenge form. The Hawaiians are now civilized, but in memory of ancient times the king still has four heralds dressed in the traditional feather helmet and mantle."

These are all of the models from the Pacific Region worth notice and if the others are as inaccurate as the representative of Hawaii* the collection is very misleading. Many unclassified arms are on the walls and in cases, among them a fine ceremonial adze from Mangaia; a Marquesan paddle; 2 fine Solomon Islands longiels; Fijian Pineapple club and war paddle; a New Caledonian Jade disk club and 2 short adzes, and one with a large stem that seems not to belong to it.

Crossing the Channel we find the same condition of things as in Paris, in that the collections are scattered and in so far of diminished value, instead of being united in one grand Museum of Ethnology. It is unfortunate for ethnology that so rich a nation as England should not find the means to build a palace worthy of the treasures her explorers have brought home, which are now laid aside for want of room in a museum where ethnology is of very secondary importance, or exhibited in dark rooms with insufficient labels and no catalogue for the visitor, or scattered through museum buildings intended for other puposes and often grandly fulfilling those purposes.

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*The Hawaiian figure is evidently copied from the figure in one of the French Voyages.

In the South Kensington Industrial Museum are two fine Maori carved canoe prows deposited by H. R. H. the Duke of Edinburgh to whom they were given while he was in New Zealand. In the Kew Garden Museums are the following from Hawaii:—A *Lagenaria* gourd of the largest size with cover and net. Many kapas wrongly attributed; seeds of *Gardenia brighamii*. From Fiji a fine coconut fibre model of a temple given by Dr. Berthold Seemann the distinguished botanist: The Royal United Service Museum in Whitehall Palace has a very interesting ethnological collection of which the Secretary of the Club kindly permitted photographs to be taken. Arranged on the walls of the entrance are many fine spears and clubs.

*Hawaiian Islands.*

Helmet of good form with broad crest, of plaited rush, with no signs of feathers. Hula drum of admirably carved coconut wood and with shark-skin head. *Kupee ilio* or anklet of dog-teeth of large size but discolored and dilapidated. 2 Boar tusk bracelets, one of entire teeth the other of cut ones. Newa of kauila wood. Stem of a coconut tree "pierced by two musket balls" during the Cook episode (Capt. H. W. Bruce). Knife of Shark-teeth of unusual form, open in the middle, with 9 teeth on each side and one at the end. Another of common form with 8 teeth.

*New Zealand.*

Mere of greenstone 19 inches long; another almost as large; 5 of common form; 2 of jade. 4 Patu of carved wood, 3 patu of whale rib. 3 Jade adzes. Canoe stern, rather small. 4 Taiaha, labelled paddles. 2 Tewhatewha or battle axes.

*Tongan Islands.*

Drum of wood the lower half of the cylinder elaborately carved, as are the knobs for attaching the cords which tighten the drum-head. Clubs finely carved; a small one in the case of relics of Captain Cook is labelled "given by the king of Owhyhee to Capt. Cook." Paddles, large and well carved.

*Society Islands.*

Stone adze with handle. Several spears.

*Marquesas Islands.*

2 clubs of the finest quality. 2 Paddles, long and good.

*Gilbert Islands.*

Suit of coconut fibre armor with the curious shark-teeth weapons for the fore-arm with nine longitudinal rows of teeth. A suit of similar armor from Nawodo has a hemisherical cap and an upright cape like those in Berlin and Hamburg.

*Solomon Islands.*

2 reed shields, one rectangular, the other with rounded corners. Several bows. Clubs with the fern plaited covering almost gone.

*Fiji.*

6 War paddles. Club, musket pattern, of immense size; 5 common ditto; 11 Knobbed; 3 Pinapple; 11 Throwing; a round one 3½ inches in diameter.*

From Niue several paddles: from New Guinea a bow of bambu: and from the Admiralty Islands spears with obsidian points. Mr. J. Edge-Partington was correcting the mistakes in the labels.

The massive building in Great Russell street which contains the sculptures, library, ethnological and art collections of the British Museum has in its very entrance porch two of the Easter Island stone figures, of one of which the Bishop Museum has photographs. Within the gloomy building with long galleries lighted only from above, and in a London atmosphere of course badly lighted, are crowded most astonishing collections from the Pacific Region. A very important part is the loan by the London Missionary Society of the many rarities brought to England by the late Rev. William Ellis and other missionaries; This is perhaps the cream of the collection from Polynesia.

*Hawaiian Islands.*

Feather cloak, red with yellow rhombs; another red with yellow circles with red centres*. 2 Helmets, once feathered (Meyrick Collection). 4 Helmets with feathers in good condition; 2 Helmets from Vancouver's collection, in fair condition with feathers. Helmet of wicker work and detached crest. Kukailimoku (Leverian Museum). 4 Kukailimoku, one of them figured by Cook. Many feather leis. 2 Rectangular feather mats possibly used by the *kahuna* or priest as a mat for the idol or *aumakua*. 2 large idols of wood (Black ohia?). Curious wooden idol with helmet: there are no legs and it was apparently carried on a pole as was the god Kukailimoku. It is covered neatly with kapa like some idols from the Marquesas. Fig. 49, Pl. XII. Another wooden idol with the peculiar form of trimmed hair called *mahiole*. Fig. 50, Pl. XII. Wooden idol with wide mouth well armed with teeth and with head slightly reverted. Fig. 51, Pl. XII. Wooden idol somewhat larger with human hair. 2 Wooden heads of images, probably idols. Idol of stone and fragments of another from Necker Island, taken thence by officers of H. M. S. Champion. Aumakua. 5 Kahili, small with bone and tortoise-shell handles; 8 Stone mirrors, good. 5 Kupee or bracelets of boar teeth, large (Vancouver). 6 Ditto, with tortoise-shell. Niho palaoa (W. Ellis); 7 Common Niho palaoa; one with 4 small bone or shell nihos, and a similar one with 6 little nihos. 2 Nihos small and broad. Leis of small red, white and black shells [†V]. Leis of *Strongylodon lucidum* and shells of *Patella striata* [V]; Leis of *Cypræa moneta* [V]; Leis of *Conus* [V]. Hula drum of coconut wood with shark-skin head; another without head. Hula drum of coconut wood well carved. Large feathered hula rattle (Uliuli hula). 2 Kupee hula with rows of brown and white *Melampus* shells; 2 of black beans *(Strongylodon lucidum)*; 2 of dog-teeth (niho ilio); another of dog-teeth [V]. Drum of coconut wood on which is bound a coconut drum (Puni hula). Fig. 48. 2 Ipuhokiokio. 6 Ie kuku or Kapa beaters; 3 Ie kuku [V]. 2 Pa'u boards, the larger one said to have been given to Captain Beechey by Queen Pomare (Tahiti).

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*The Bishop Museum has a round Vitian club 11 in. in circumference, 44 1-2 in. long and weighing 12 1-2 pounds. (No. 1033.)

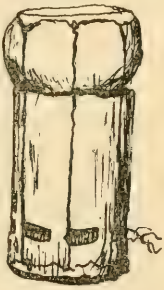

Fig. 48.

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* Colored drawings were obtained of seventeen feather cloaks and capes, which will be described in another publication.

† V stands for Vancouver Collection.

Cleaner for Pa'u board. 5 Ohe kapalapala, common; another with die of tortoise shell. 14 Ulumaika, all but one white. Ipu aina with human teeth. Ipu kuha or spitton, square. Umeke of wood with cover. 5 Huewai pawehe; 2 ditto [V]. Board for scraping oloná. 2 Poi pounders, common; one of ring form (Pohaku puka). Stone lamp, common form. Coil of waoke rope, square braid. 2 Gourds, long. Many stone adzes, 4 with handles. 2 Umeke covered with plaited roots of ieie *(Freycinetia arnottii)*. Inamona dish of wood, crescent-shaped. Carved female figure for seat. Fig. 56, Pl. XIII. Kukui nut candle. Carved bowl with two human figures for support. Fig. 51, Pl. 12. 3 Tobacco pipes. Kilu or top of ipu pawehe. Small mirror in wood frame on top of which are carved two miniature tobacco pipes. Fig. 53. Double canoe model; model of single canoe, no outrigger. 2 Carved figures for fishpole rests in a canoe. Carved canoe rest [V]. Common paddle. Newa or hand club of basalt; one of kauila wood; one of kauila [V]; ditto with stone head [V]. 2 Ihe pahee, large and good. 3 Swords of kauila wood with cord lashes. 6 Pahu, long and flat with distinct handles. 15 Throwing spears (Ihe). Maa or sling-stone. 5 Barbed spears, the barbs carved from the thickness of the wood. Small ipu le'i to contain fish-hooks. Many fish-hooks. 10 Wicker disks covered with feathers and with shell and wood knobs: use unknown. 5 Leiomano; 2 Leiomano [V]; 7 Leiomano or shark-teeth cutters. Fig. 58. 2 Rude knives of shark-teeth, one open. Shark hooks. Sinker for squid hook. 2 Short knives of shark-teeth. Fans of ancient form. Fig. 61, Pl. XIV.

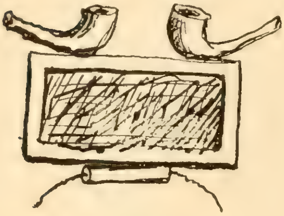


Fig. 53.

*New Zealand.*

6 Kumara *(C. batatas)* spades, common form but some with well carved rests; several detached rests. 12 Tikis or images of large size. 4 Carved slabs. 2 Carved slabs for Pataka or food-store. 3 Door caps finely carved; 2 carved door posts. 2 Canoe sternposts, carved. 4 Canoe models. 2 Paddles, common. 2 "Bull roarers". 13 Tatuing implements. 6 carved funnels for feeding chiefs during the moku or face tatuing. Carved genealogical

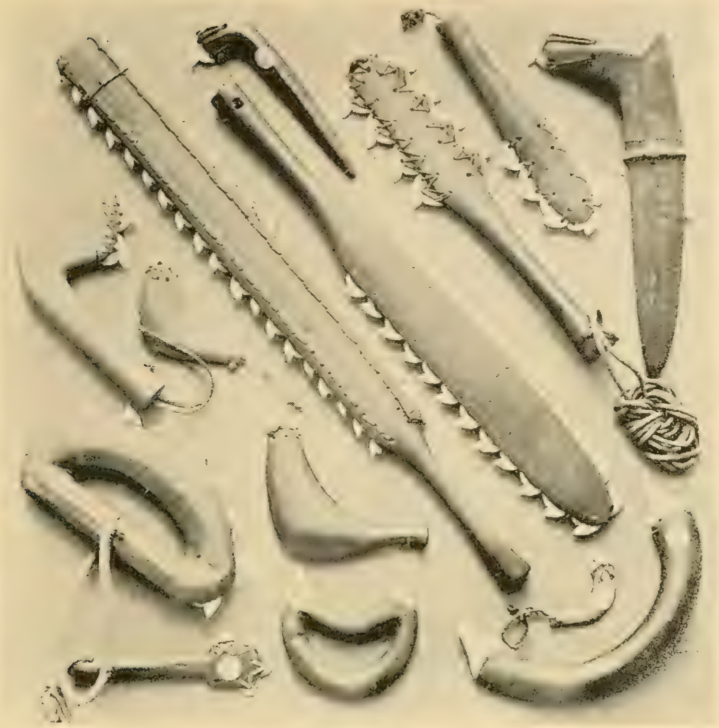


Fig. 58. Hawaiian Shark-tooth Implements.

stick. 2 Balls for the game of *Poi*. 4 Dried and mokued human heads. 8 Tikis, small. Mussel Dredge. 24 Taiaha and many duplicates. 8 Tewhatewha or battle-axes. 13 Mere of jade. 28 Jade adzes. 7 Jade chisels. 28 Jade Heitikis. 2 Heitikis of human skull. Many earrings both of jade and of bone. 3 Carved adze handles. 29 Carved Kumetes (Boxes for ornaments), one of choice work (Cook's Voy.). 14 Carved wood and bone short whistles; 17 Carved wood whistles; 2 Whistles of plain wood. 2 Knives of jade for trimming priest's hair. 2 Long trumpets and another much shorter. 2 Trumpets of Triton shell with carved mouth-pieces. Kete of common kind. 4 Carved sacrificial knives with shark-teeth on one edge, the teeth very serrate and of a kind not seen elsewhere. Fig. 62, Pl. XIV. 2 Cloaks of Kiwi feathers. Many common cloaks and capes of

*Phormium* flax. 4 Heru or combs of bone, common form. Greenstone adzes in great number. Wooden shark hook carved all over. Whale-tooth ornament for the breast, engraved with human face.

*Society Islands.*

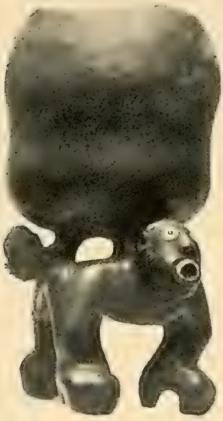
Warrior's belt of small bones strung lengthwise. Pearl-shell breast ornament. 4 Sacrificial or temple lamps, attributed incorrectly to the Hawaiian Islands. Fig. 60, Pl. VI. Large wooden god; another, hollow, with many small figures all over it (See Ellis, Poly. Res.). Wooden shrine for *Tii vahine*. Dress cap of feathers and *Ovulum* shells. Long cylindrical wooden gong with longitudinal slit, well carved. 3 Wooden drums like the Hawaiian. Full dress for mourner (Figured in Cook's Voyage.) 3 Gorgets of feathers and shark-teeth on a fibre net. See Pl. II. Many bambu flutes. Breast ornament of feathers and square bits of white shell. 2 Pillows of bi-colored *Pandanus* leaves. 10 Basalt poi pounders, very well made. 5 Wooden images, various treatment. 5 Kapa beaters. 2 Sunshades (See Fig. 48, p. 34). 4 Wooden stools, well cut. 2 Wooden boxes for chief's ornaments: 2 smaller similar boxes. Large wickerwork head-dress from Ulietea (See Cook's). 14 Mounted stone adzes, common form. 3 Wooden pillows like the stools but lighter. 2 Gods of open carved wood from Mitiara. Bambu quivers with arrows (origin uncertain). Bailer for canoe. 2 Large wooden shark hooks. Netting needle 24 inches long. 4 Wooden adzes for cutting Breadfruit. Large weapon edged with shark-teeth carried by mourner. Pa'u board exactly like the Hawaiian one "given by Queen Pomare to Capt Belcher".

*Samoan Islands.*

Pump Drill, fine. Many fans without variety. Assortment of Tatuing implements. Baskets of common work. 3 Frontlets of Double rows of Nautilus shell. Upete. Human hair belts. 2 Stone adzes with handles. 13 Stone adzes in the rough. Wooden thatching needle.

*Niue.*

6 Paddle clubs. 5 Projectiles of stalactite, several too large to be held in the hand. Many spears with two prongs; many common spears. Spear with "stag horn" head. Fig. 68, Pl. XVII.



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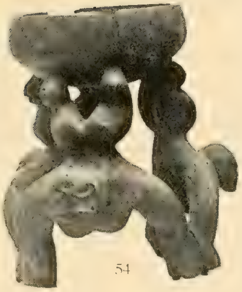

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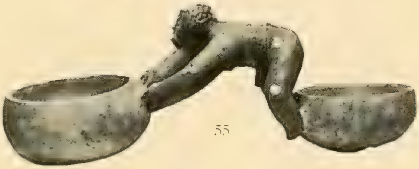

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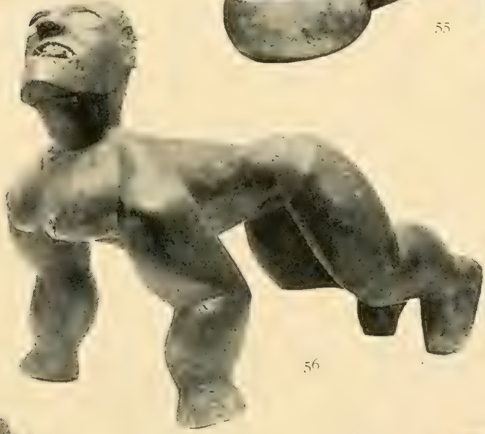

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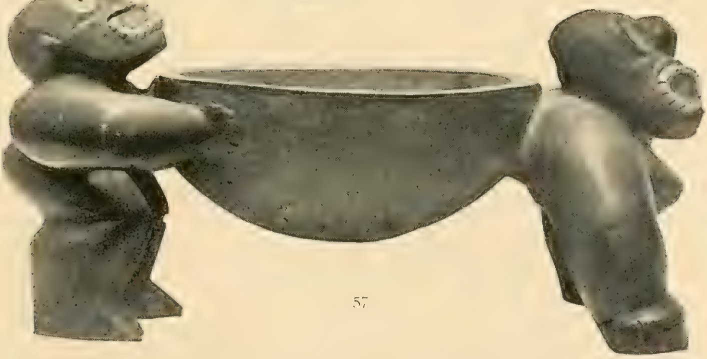

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Hawaiian Carved Images: British Museum.

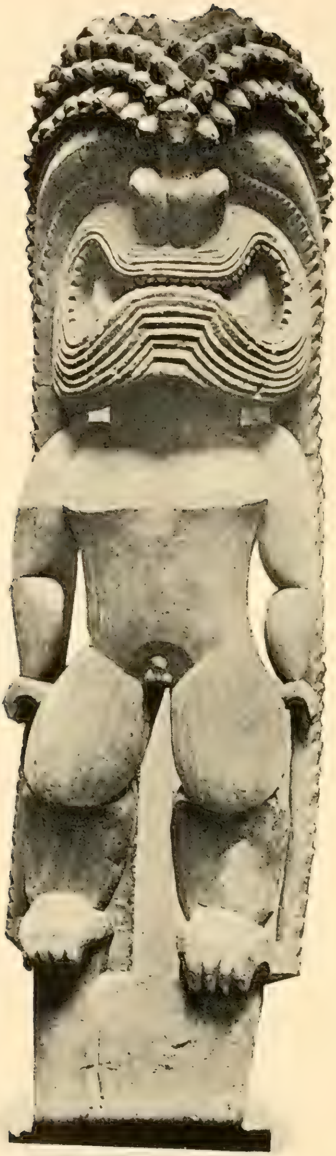

FIG. 59. HAWAIIAN IMAGE: BRITISH MUSEUM.

Staff or pole. 2 Fish nets of conical form. Canoe model. Kapa figured and with long fringe. 2 Kapa beaters.

*Marquesas Islands.*

2 Pair fine stilts, complete. Sticks 6 ft. long, 2½ in. in diameter, chafers of kapa. 8 Carved stilt rests, 2 of them distinctly male figures. 6 Clubs of the finest kind. Fig. 64, Pl. XVI. 6 Long paddles. Net for gourd container. Several slings. Kapas from Egmont Island. 2 Gorgets of wood covered with beans of *Abrus precatorius.*

*Easter Island (Rapanui).*

2 Immense stone figures. 9 Male and two female figures well carved from driftwood; Large and small figure both roughly carved. 2 Carved birds and several grotesques. Carved human hand. 5 Small dance paddles. Obsidian lance heads. Rope of human hair. 5 Gorgets of wood, the usual crescent form, one inscribed with hieroglyphs.

*Tongan Islands.*

Drum 52 inches high, carved. Cylindrical horizontal gong. 5 Adzes. 14 Combs. 7 Heavy paddle-head clubs. Food hook with disk. Mats of open work. Club with tobacco pipe worked through the head. 2 Aprons of bird bones and shells. 2 Baskets of fine sennit, Fig. 66, Pl. XVI, and boxes covered with basket work. Large kapa beater. Many pillows of carved wood, and others of bambu like the Samoan. Canoe model. Bows. Many fish-hooks of the usual heavy pattern.

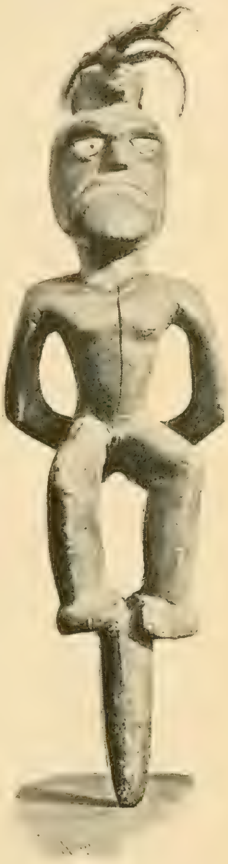

Fig. 63.

*Hervey Islands.*

5 Carved food-scoops. 6 Gods of carved wood. Finely carved cylindrical drum. Fig. 65, Pl. XVI. 22 Carved paddles, one with double end, 4 with flat heads, the rest with rosettes; about a dozen duplicate paddles, smaller, 4 Carved "District gods". Feather caps. 10 Ceremonial adzes, short; 10 long ones, and

one five feet long. Kapas with black figures. 2 Stalactite pounders.

*Gambier Islands.* Large paddle.

*Paumotu Archipelago, Manihiki.*

Paddle, club and bowl inlaid with pearl shell disks. 3 Carved wooden bowls. Soul trap of large size.

*Fiji.*

Cap of spider-web, good specimen. 62 Pots of various shapes. 5 Wigs of human wool. 13 Clubs, pine-apple form; 31 Musket and lotus forms*; 13 Knobbed; 12 Throwing; 6 Round; Many duplicates. 14 War paddles and many duplicates. Several ornamental paddles. 6 Yaqona bowls. Yaqona bowl given by Cakabau, 44½ in. in diameter†; the largest I have seen. Model of temple in sennit. 2 Kapa roll markers of bambu. 3 Carved food hooks. Lali or gong, good size; 2 smaller. Oil dishes in great variety. 2 Rolls of sennit. Tatuing implements. 2 Kapa beaters. Girdle of *Oliva* shells. 4 Cannibal forks. Stem of Shaddock tree in which are imbedded some of the bones of a chief and his son, relics of a cannibal feast.

*Solomon Islands.*

2 Food dishes of large size. 4 Clubs covered with plaited fern; many common clubs. Package of *Canarium* nut food. 4 Pandean pipes, one of irregular form. 8 Fish floats. 6 Small human figures in wood. Many longiels both war and dance. 4 Clubs, San Cristóbal. 3 Clubs of unusual form. 15 Adzes with handles. Ear-plugs of wood with inlaid faces. Sunshade like Tahitian. 2 Jew's harps of bambu. Pump drill with fly of uncommon form; another with the spindle of palm wood bulging, fly of bone, circular, handle of bambu. Inlaid handle of club, stone head gone‡. 4 Pieces of yellow kapa; also some red; others blue. Model of canoe. 2 Canoes finely decorated. Chief's shield, Florida. (See *Brenchley, Voy. of the Curaçoa.*) Curved shield inlaid with a fret of pearl-shell squares. Wooden shield. 5 Shields with round ends, 4 with square ends, plain. 9 Paddles, pointed. 10 Paddles ornamented, some oval. 6 Canoe figures. 16 Carved bowls, various shapes. Reed-woven burial hut con-

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* Among these the beautiful form shown in Plate XVIII.

† That in the Bishop Museum, which also belonged to the Vitian king, is of better form but only 32 3-4 inches in diameter.

‡ Like No. 1373 in Bishop Museum.

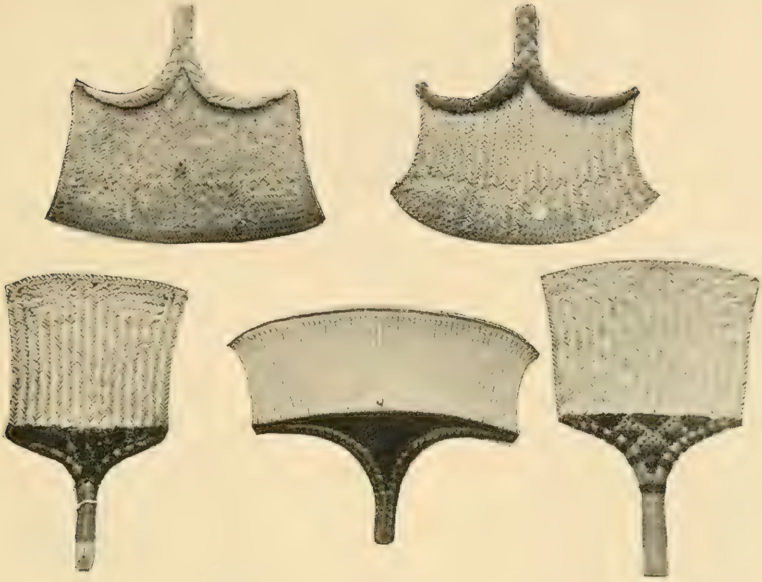


FIG. 61. HAWAIIAN FANS.

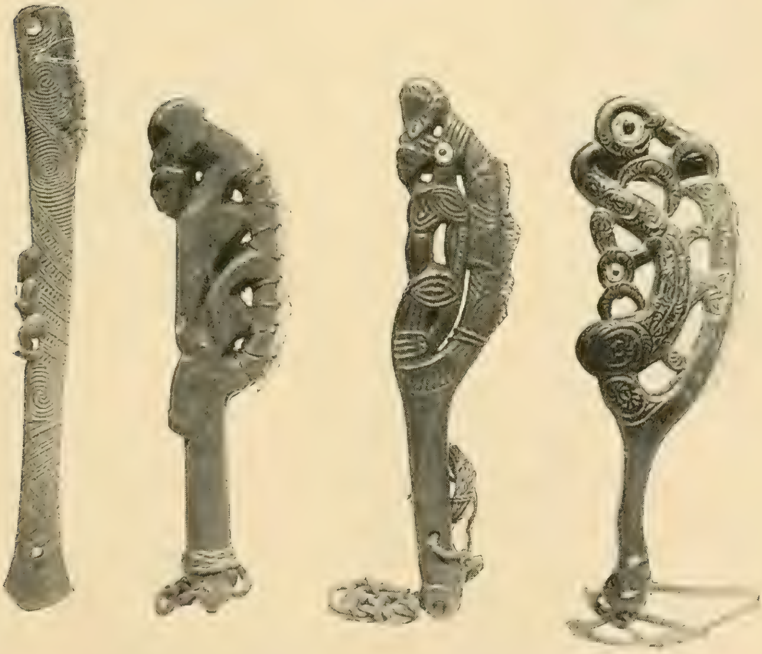
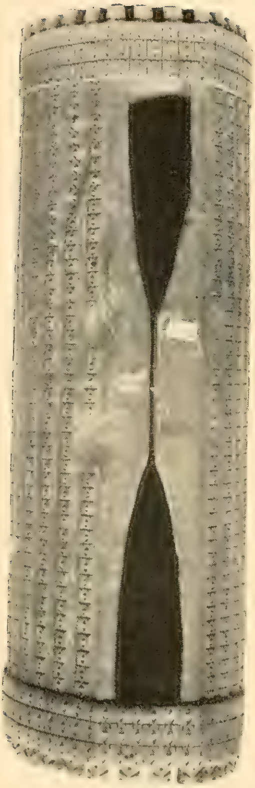


FIG. 62. MAORI SACRIFICIAL KNIVES.



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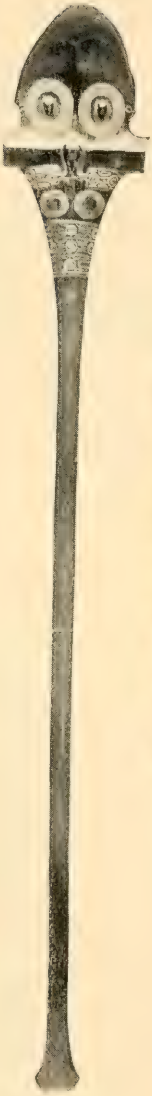

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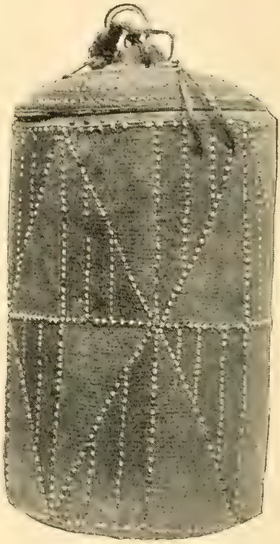

66

Objects in British Museum.

taining the skull of a chief of Rubiana; around the skull are rings of *Tridacna* shell. 16 Choice spears.

*New Caledonia.*

5 Disk clubs of greenstone or jade. 4 Jade adzes. 5 Short-handled adzes. 2 Long-head adzes. Death Mask, in poor condition. 2 Kapa mallets. 2 Corded calabashes. Slings, pouches and sling-stones galore. Fish net with shell sinkers. Many clubs. Club of great diameter. Club of the bird-bill form but double like a pickaxe.

*New Hebrides.*

3 Santa Cruz fishing floats. 4 Looms. Large human figure. Clubs of common form. Banks Island kite made of palm leaf. Fig. 69. From same group long wooden bowls and 2 obsolete dresses described by Codrington.*

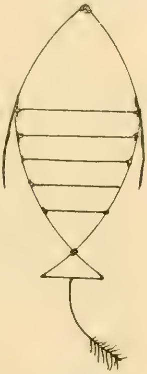

Fig. 69.

*Micronesia.*

2 Suits Gilbert Islands armor. 2 G.I. Cuirasses. 2 Gauntlets armed with shark teeth. Human figure in wood about 15 inches high, Pleasant Island. Ualan loom of rude form. Swords and knives of shark teeth in great number. Kusaien sword in bone and shark teeth. Nukulaelae club or axe with blade of turtle bone. Rope of plaited human hair. Caroline Islands mat bed. 3 Coconut fibre and 3 fish skin caps from Gilbert Islands.

*New Ireland.*

7 Chalk figures, not remarkable. Wooden fiddle (New Britain).

From Australia and New Guinea there are many specimens, but none uncommon or not to be found in most good collections, were seen. Among other most interesting things examined in this great museum by the kindness of Mr. O. M. Dalton, were the volumes of original drawings of the Cook Voyages, among them several pen and ink sketches by the great Captain himself. Good copies of the most important drawings relating to the Hawaiian Islands are in the Bishop Museum. Another capital thing noticed here is the very skilfull way in which Mr. Dalton keeps his book of accessions, making a pen sketch of the article entered. Where Curators are able to do this no better system has been devised. The accomplished Director C. H. Read, Esq. gave me every facility for examination and study.

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* The Melanesians, p. 108, "*Malo-saru*".

From London a short excursion was made to Cambridge. Back of the Fitzwilliam Museum, reached by a narrow lane squeezed out of the edge of a churchyard, is the Archæological Museum, and in a side room of this is the finest collection of Fijian articles in any museum. This was made by Baron von Hügel who was most kind in explaining the specimens and offering the hospitality of his pleasant home. The hope may properly be expressed here that Baron von Hügel will soon publish the results of his careful investigations in Vitian ethnology. The following list includes the most noteworthy contents of this museum:

*Fiji.*

52 Clubs knobbed, 3 of them inlaid, 10 bound with sennit; 23 Pine-apple; 8 Lotus, a variety of musket; 58 Musket; 47 Round; 28 Throwing. 28 Paddles, one bound with net, 17 carved. 65 Spears finely carved, some bound with sennit. 84 Pots, 1 tripod, 3 tortoise-shaped, 2 cooking pots. 16 Carved wood pillows; another carved with a human leg. 13 Kapa beaters, all ribbed. Many decorated bambus. 18 Cannibal forks, one the original of the figure on the cover of Miss Gordon Cumings' "Fiji". 9 Nose flutes. 3 Bambu marking rolls. 4 Shark hooks. Netting needles. 13 Collars of whale teeth. 49 Dishes of carved wood. 5 Yaqona bowls. 8 Fish hooks. 3 Trumpets of *Triton* shell. 8 Sets of tatuing implements. 3 Upete of leaves; 1 of wood. 2 Girdles of *Oliva* shells. Necklace of ivory human figures (Alaska?). 41 Oil dishes. 9 Combs of carved wood. 5 Shell gorgets. 33 Wooden dishes on stand. 3 Yaqona strainers. Yaqona cups in great number. 3 Coconut cups with coir wipers attached. 2 Canoe models. 12 Fans, common forms. 5 Wigs of human wool, 2 of them bleached. Model of "Devil House". Baskets and satchels of many forms. 6 Fringe dresses and many others of less size. Kapa sulas, not remarkable. Many stone adzes.

*Hawaiian Islands.*

Ring Poi pounder; several of common form. A number of stone

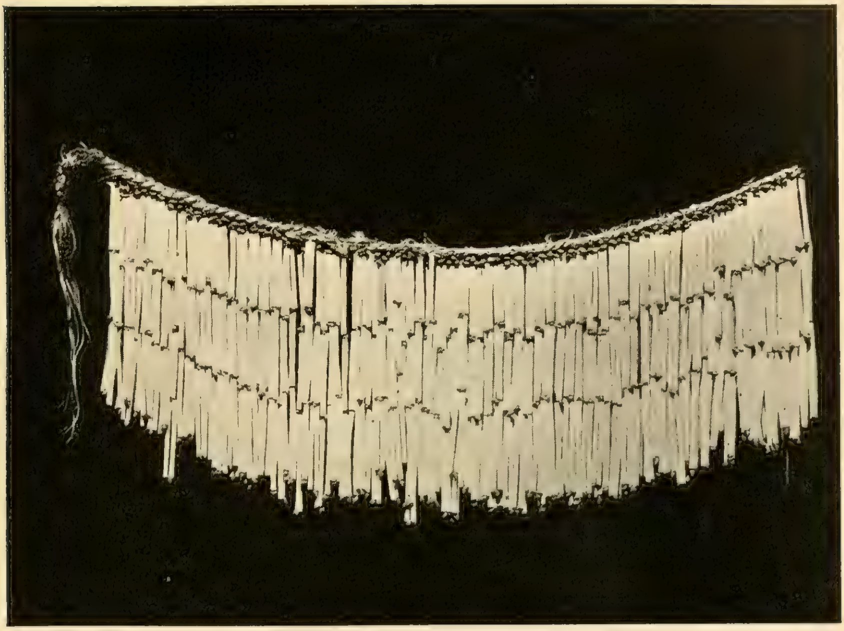


Fig. 67. Tongan Bone Apron.

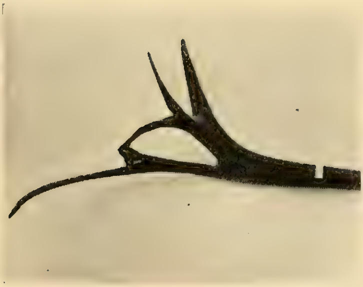


Fig. 68. Niue Spear.

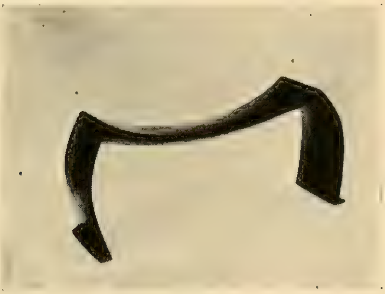
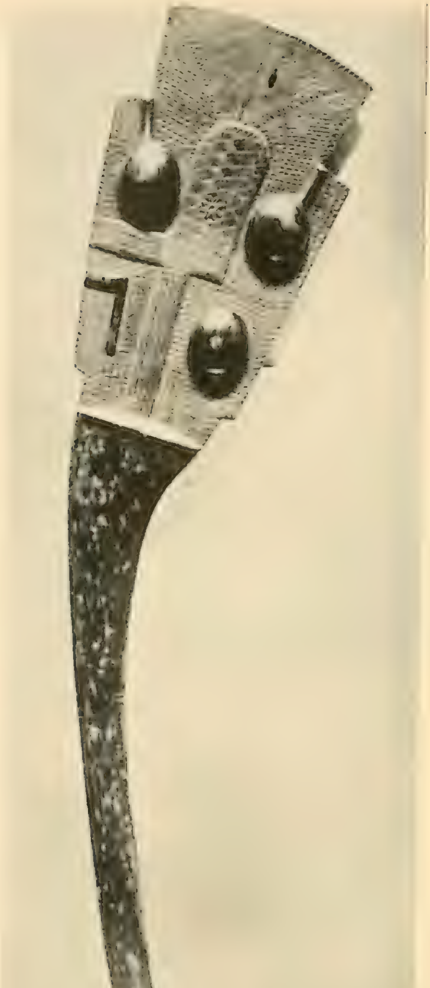


Fig. 44. Tongan Pillow



LOTUS CLUB, FIJI.

adzes. Kupee hula ilio. Kupee of boar tusks. Huewai pawehe, small but good.

*Marquesas Islands.* Club and 2 stilt rests.

*Society Islands.*

A stone Sorcery Lamp with Rev. Geo. Bennett's label on it, and precisely like the four in the British Museum wrongly attributed to the Hawaiian Islands. See Fig. 60, Pl. VI.

*Tongan Islands.* 3 Paddles and many good clubs.

*Samoan Islands.*

2 Nautilus shell frontlets and several clubs.

*Hervey Islands.* 6 Ceremonial carved paddles.

*Rapanui (Easter Island).*

Double paddle. Gorget of wood, usual crescent shape. Image and a carved lizard.

*New Zealand.*

Canoe model. Tata or bailer, broken. 5 Taiaha. 4 Carved Kumete. Dried and mokoed head of good quality. Carved funnel for feeding a chief while being mokoed. Flax pounder with head carved on the handle of the stone. 3 Mere of bone; 1 of jade; 3 of carved wood. Patu of bone and a small one of wood. 3 Tewhatewha. Carved whistle or fife. 2 Carved whistles. 3 Paddles. Prow and stern of war canoe. Jade adze in carved handle. 9 Heitikis of jade. 2 Jade ornaments. Bone heru or comb. 5 Earrings of jade; 2 of carved bone. Large bowl. Chief's staff.

*New Guinea.*

11 Shields of wood; 4 of hour-glass form; 2 plaited.

*Solomon Islands.*

Paddle and club, both plaited with fern. Large canoe model. 4 Shields. 4 Longiels. Large food bowl and 3 smaller ones. 3 Bows and many arrows. 2 Canoe figures.

*New Caledonia.*

Death mask in poor order. Many clubs of the usual patterns.

Only the Vitian portion of this collection is fully arranged owing to the lack of room. A feather cape was attributed to these Islands but is undoubtedly of Chinese origin, the feathers African.

At Saffron Walden, Audley End, some fourteen miles from Cambridge, in the Museum at the east end of the church is said to

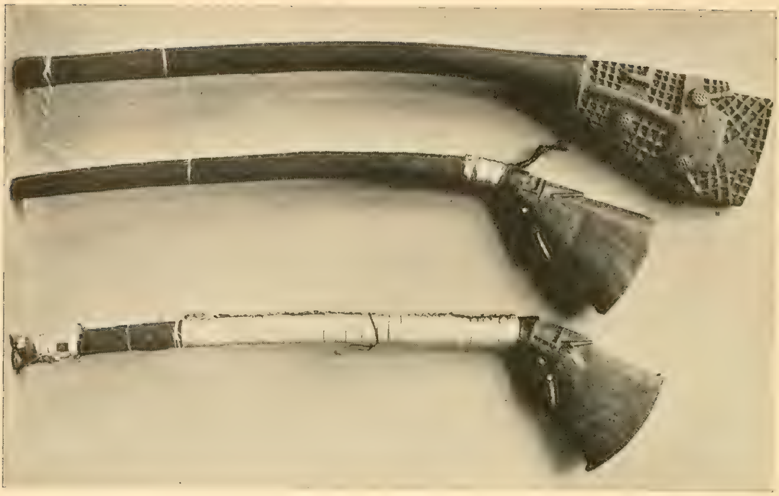


Fig. 70.

be a feather cape from the Hawaiian Islands. Another was reported at St. Augustine's College, Canterbury. It was also learned here that at Cirencester, Belfast and Dublin are Hawaiian implements in the museums, but time was too limited to explore these localities.

Another excursion was made to Oxford where the hospitality of H. Balfonr, Esq., the well-known Curator of the ethnological collections made that attractive town still more interesting. The Pitt-Rivers collection forms a large part of the Ethnological Museum which is of great extent and value, but the arrangement, while admirable for the study of comparative ethnology, renders an enumeration of specimens from a given locality almost impossible in a limited time. Thus the different methods of dressing the hair all over the world might be grouped together; the musical instruments, the projectile weapons, the means of generating fire would form other groups and this would be possible only in a very extensive collection. It is exceedingly fortunate that all museums are not arranged on identical lines, for to one geographical contiguity, to another racial characteristics, while to a third the comparative solution of problems which must present themselves to the uncivilized human beings, is the objective point of study. If then the Oxford Museum occupies but a meagre space in this report it is not from its poverty but from its richness which defies comprehension in a passing visit. Among the treasures seen were:

> Hawaiian feather helmet, the feathers gone; a small idol of wood and some fine kapas. A bowl of large size from the Solomon Islands. Fijian and Marquesan clubs, and a series of fine Pump-drills. The Fijian lotus clubs (Fig. 70) were very interesting.

It was a matter of deep regret that illness prevented my seeing Dr. E. B. Tylor to whom I had letters.

At Eltham the private collection of J. Edge Partington, Esq., was examined, and among his choice things were:

> Vitian Yaqona bowl 33 inches in diameter. 3 Marquesan clubs. Maori trumpet, better carved than any seen. New Guinea small carved wood head in which to put pubic hairs.

To return to London. In the Royal College of Physicians and Surgeons are:

> 3 Maori mokoed heads. 5 Australian skeletons. 5 Tasmanian skeletons. Several Maori and other Polynesian crania.

In the library of the Anthropological Institute is a very fine Tasmanian skeleton, and at the meeting of that society on June 9th to which I was invited, Gen. Robley exhibited 14 Maori heads that had been subjected to moko*.

At the Natural History Museum at South Kensington Sir William Flower the Director and several of his Curators did all that was needed to explain the collection and their arrangement. Both visits to this institution were made on dull days and hence perhaps the place seemed not quite well lighted in some departments. Mr. Smith the Curator of Conchology exhibited, among other treasures, the type specimen of *Helix sandwicensis*. Here as elsewhere in England they stick to the antiquated term "Sandwich Islands" apparently in ignorance that for nearly half a century the

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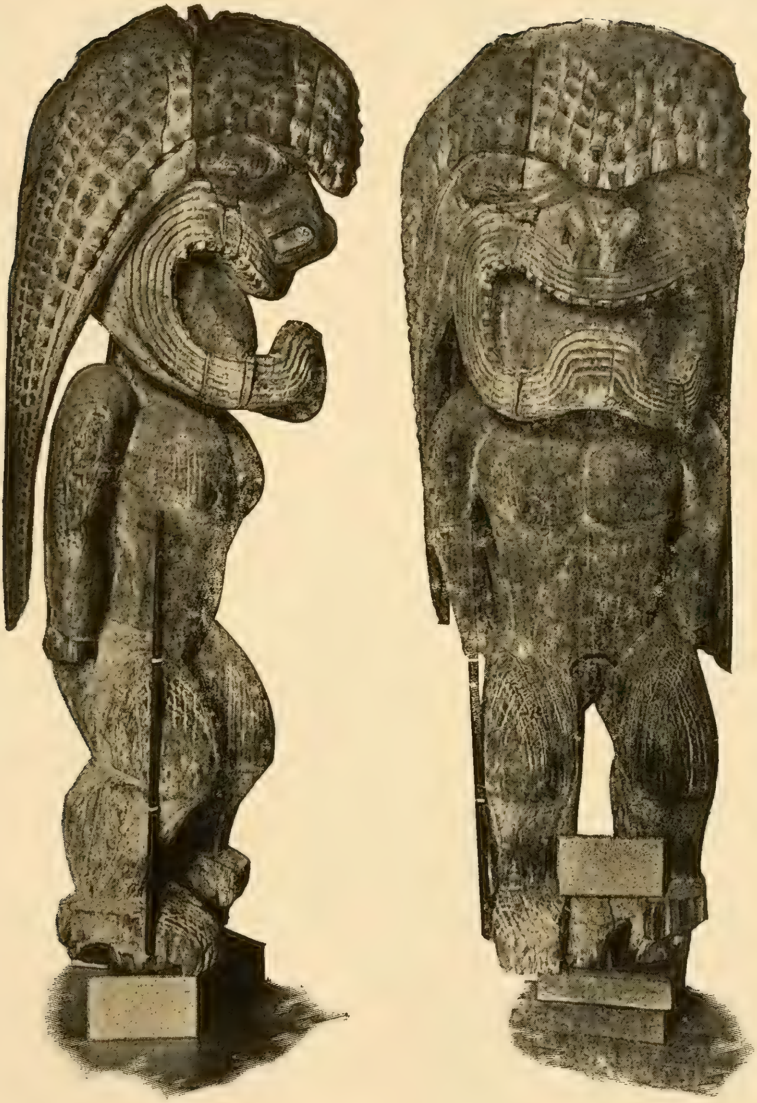
*See H. G. Robley, *Moko or Maori Tatooing*; London, 1896.

Hawaiian Islands have formed an independent nation and competent by the law of nations to select its own name. The names of the separate Islands are often miss-spelled, following Cook's very blundering method. Indeed at Oxford it was insisted that the Hawaiian Group was not only "Sandwich Islands" but was in the South Pacific, and there were large printed labels to that effect. On the continent the orthography is in advance of that of the very conservative scientific men of England: It may be noted here that the committee in charge of the exploration of the zoology of these islands by Mr. R. C. L. Perkins, whose expenses were borne equally by the British Association for the Advancement of Science, the Royal Society and the Bishop Museum, is styled (as it might properly have been in the days of Cook and Vancouver) "Sandwich Islands Committee", and the chairman Sir Alfred Newton declared that under the term Hawaiian Islands they could not have secured an appropriation!

To return to the Natural History Collections at South Kensington: the following are the notes made in what was certainly a very hurried and superficial examination. There is no criticism of the immense scientific value of the collection, nor of the vast work and learning that Sir William Flower and his able assistants have expended on the museum; it is simply as the place appeared to a visitor who had seen the principal similar collections in the world.

"The collection of corals (especially the Madreporarian) is very fine, usually illustrated with colored diagrams of the polyp. The Reptilia are generally well mounted, and the Saurians especially so. Gigantic Land Tortoises abound. Fish are by no means attractively arranged, but the Birds are intended to be capital, and in many cases they certainly are as near perfect as the taxidermist is likely to make them; in some, however, there is a very "artificial flower" atmosphere about them. In the Botanical Hall at the top of the building large specimens of *Raoulia eximia*, Hooker, the "Vegetable Sheep" of New Zealand were very interesting: the drawings of Fungi excellent. On a huge section of



Hawaiian Idol: Salem, Mass.

tree a man was painting memoranda of historical events of the centuries the tree had lived and formed its rings. The Palæontological Rooms are wonderful, but the collection of Moa bones does not equal that at Christchurch, New Zealand. The Hall of Minerals above it is rather dismal (I remember that was its character when thirty-three years ago I visited it in Great Russell Street with all the enthusiasm of a young mineralogist), as nothing breaks the flat uniformity of the cases. Vienna and Paris present a much more attractive exhibition. The Cetaceans in the basement were well worth a visit*. The British collection is capital and very accessible to students and amateurs. The statue of Darwin at the head of the stairway and that of Sir Joseph Banks higher up at the other end of the hall seemed where and what they should be. The former looks down upon cases filled with illustrations of the special studies to which the elaboration of the Darwinian theory gave rise."

Leaving England June 13 on the "St. Louis" from Southampton for New York, the first museum visited in America was that of the Philadelphia Academy of Natural Sciences. Here Dr. Sharp, Prof. Heilpron, and Mr. Pilsbry did all in their power to make the collections accessible. While this museum is strongest in mollusks and birds, there were in the ethnological department some good kapas brought by Rembrandt Peale of the United States Exploring Expedition from the Hawaiian, Society and Tongan Islands. This department was not yet arranged in the new wing recently completed. Washington was reached June 24th and the National Museum was the chief attraction. The late Dr. J. Brown Goode, who was at the head of the museum, and Professor Otis T. Mason, the Curator of Ethnology, were exceedingly obliging, the former promising to send to the Bishop Museum a complete set of the publications of the U. S. Fish Commission of which he was also Director. With Prof. Mason the Pacific collections, largely from the Wilkes Expedition, were examined and fine specimens of kapa obtained. Among the Hawaiian matters were:

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* Since then a very admirable system of exhibition has been adopted; the skeleton is enclosed on one half by a covered framework representing the outer surface of the whale.

> 5 Lei paloa of good quality. Feather cloak. 2 Feather capes (the best one on deposit). Feather lei of *Oo*. Ie kuku, the largest seen in any collection, and several good ones of ordinary size.

The casts of Australian, Papuan, Maori and Samoan are good in the order named. The Samoan is a most unfortunate selection for type as he is emaciated and shows not a particle of the *embonpoint* so characteristic of his race. There were fine Vitian spears and clubs but everything was terribly crowded in a wholly unsuitable building. It is to be hoped that the American people will some day demand that Congress shall appropriate several millions for a proper edifice for this great National collection. An agreeable interview was had with Dr. Rathburn at the Fish Commission Building.

In New York was found the American Museum, perhaps the best all round Natural History museum yet seen. In the first place the building wastes nothing in mere architecture but is strong, fire-proof, well lighted, capable of extension through the large open space in which it stands, and is accessible and well adapted for its purpose. The best building in the world will not make a great or useful museum, and unless the contents are well selected, sufficiently numerous and well preserved and arranged both for exhibition and study the house is naught. Here the taxidermy was the best seen in any museum, and the labelling was by far the best seen anywhere. Dr. Franz Boaz was rearranging the ethnological portion in a hall on the lower floor, hence the specimens were not yet correctly labelled, so no attempt was made to catalogue those from the Pacific. The collection was rich however in good examples of Polynesian and Papuan work, although perhaps the strongest series is the Alaskan. Groups are frequent illustrating native work, as has been provided for with the Hawaiians in the Bishop Museum. As an example of the instruction to be obtained from the labels, the Halibut hook, *Hawana*, of the Haida Indians, a hook used by the Kamehamehas, is said to be made of the wood of the *Thuja gigantea*, the line is of red cedar bark and the whole is bound together by the split roots of the spruce tree; all of this information on the neatly printed label. In Prof. Henry F. Osborn's department the labels almost make the dry bones of the fossils live again, for there is not merely the name, locality and history of the specimen, but also a diagram of the outer form once covering the skeleton, and perhaps a picture of the nearest living relatives. Then the fossils are excavated from the bedrock and brought into high relief seen nowhere else. The collection of fossils is, by the way, one of the most complete in the world. The officers' rooms, workrooms and store rooms are capital.

There were three Australian skeletons, two male and one female. A fine skeleton of *Dinornis maximus* and seven other moas. From New Zealand was a *mere* 19.3 inches long and 5¾ wide of light colored jade, and several Heitikis of which it was noticed that the flounder-like head of one turned to the left while four turned to the right. A model of a war canoe. Clubs from Fiji, Samoa and elsewhere were still piled on the floor and could not be examined, but the general conclusion was that the museum was not strong in articles from the Pacific Region.

In Boston the first collection visited was the Art Museum where are deposited two Hawaiian feather cloaks. One was brought to Boston by the Columbia* and is of red, ornamented with yellow disks, and triangles on the borders. The measurements given on the label card (which was in most other respects quite wrong) were, 5 feet 6 inches long; 2 feet, 10 inches on neck line; 13 feet on the bottom line. The smaller cloak was of red ground with yellow border and triangles, and with sections of long feathers in spherical triangles in the midst of the cloak. It was 34¼ inches long, and 89½ inches wide. These are deposited for exhibition and are both lined with a woolen fabric which renders it difficult to examine the *nae* or net. The smaller one has been used for a sleigh-robe.

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*The ship Columbia, Capt. John Hendrick, sailed from Boston September 30, 1787, visited the Hawaiian Islands and returned to Boston August 10, 1790, having carried the United States flag for the first time around the world.

The Boston Society of Natural History was visited because it once had a fine collection of Hawaiian lavas, corals and botanical specimens given by the present writer, and a skeleton of a Hawaiian woman given by the late Horace Mann. The building was found in an untidy condition, the collections crowded, in poor condition, and often incorrectly named. The La Fresnaye collection of birds has suffered much from neglect during the past twenty years and the labels are often surprising as in the series of the Australian *Gymnorhina* which are absurdly confused. This museum possessed a dried Maori head.

In refreshing contrast to this was the Museum of Comparative Zoology in Cambridge. Certainly there was not a great deal from the Pacific except in corals and mollusks, but there was an Australian skeleton, and a small number of Hawaiian birds from Wilson. The Ware collection of Blatscha glass models of flowers is very attractive, although some of the tropical flowers and fruits did not seem to have full size or color. Perhaps in Jamaica where the material for these was mostly collected fruits do not color so brightly as on the Hawaiian Islands. In this museum everything was clean, well preserved and in order.

The Peabody Museum of American Ethnology and Archæology certainly gives its first attention to American matters, and under its distinguished Director Prof. F. W. Putnam (who is also Director of the American Museum in New York), it has attained an important place among the museums of the world. Still it contains, probably by the force of gravitation a number of articles from the Pacific of which the following is a tolerably complete list at least of the Hawaiian specimens on exhibition:

*Hawaiian Islands.*

Auamo or Bearing-stick, common form. Broom of coconut leaf ribs. Laau melomelo, large. 5 Huewai pawehi; one of common kind. Umeke of wood 20½ inches in diameter, flat. Umeke of wood, small. Ipu kuha, round with hook handle. 2 Kahuna awa cups of coconut. 2 Knives of kauila wood set with shark teeth, one with 14 the other with 15 teeth. 5 Pohaku kui poi. 3 Polulu kauila, smooth; 12 Pololu (spears), barbed. Laau lomilomi kua. 2 Koko puupuu. 13 Koi pohaku (stone adze heads). Niihau mat. Niihau moena pawehe given by W. T. B. Oloná fibre prepared for spinning. Square fish basket of pandanus leaves. Umeke pawehe ipu with plain cover, broken and in net, large. Rattle of ipu and one of coconut. Ipu hahano or syringe. Ipu pueo, not finished. Hula drum, ipu pawahe; another plain. Ipu pawehe for keeping kapas. Ipu pawehe. Lei of Niihau shells. Lei of *Coix lachryma.* 2 Lei of *Oo* feathers (perhaps dyed). 3 Lei niho palaoa. Lei niho and hook. Kukui nut lei. Lei of white *Pecten* shells. Several bone bosses for kupee. Kupee of boar tusks, good. 3 Kapa moe with pink kilohana. Kapa pa'u hula and many kapa specimens, including some of the Cook series. 2 Umeke kou, Helmet of red and yellow feathers, common form. Helmet of wicker without feathers. 4 Paddles, 3 of them with ihu. Model of double canoe. Model of single canoe with sail but no outrigger. Model of single canoe, small. Large Ie kuku, 3 inches on a side; 7 common ones. 4 Koi pohaku with handles. Stone bowl. 3 Ulumaika. 2 Squid hooks and 2 sinkers for squid hooks. 4 Polishing stones. Sling stone from Nuuanu pali. Netting and needles. Niihau mat fine old fragment. Pillow of coarse pandanus, also model of pillow. Lei of dried *Solanum aculeatissimum.* Assortment of cordage and braid. Fans of pandanus and of coconut leaf. Pounder of curious form. 8 Bone fish hooks. Tobacco pipe of orange wood. Ukeke with two strings.

*Tonga Islands.*

4 Clubs. 3 Wooden pillows, two of them broken.

*Marquesas Islands.*

5 Clubs, good. 3 Paddles. 3 Gorgets of wood once covered with seeds of *Abrus precatorius.*

*Hervey Islands.*

Carved wood seat like those from the Society Islands. 8 Carved ceremonial paddles. Carved paddle with central opening. 7 Ceremonial adzes, one small and one well carved.

*New Zealand.*

4 Mere of greenstone; another thick and coarse. Human head

carved in kauri gum. Taiaha. 3 Tewhatewha without feathers or ornaments. Small canoe prow, well carved. Dress of *Phormium* flax. Carved stick (genealogical?).

*Fiji.*

6 Clubs, pineapple; 8 Clubs, musket; 1 Lotus; 11 Throwing; 4 Knobbed. Yaquona bowl 27 in. in diameter, good. 7 Pots, common forms. Oil dish, small. 8 spears of fine quality; many ordinary ones. 3 Fish spears, 4 pronged, sennit bound. Cannibal fork. Stone adze. Woven leaf satchel. Pandanus fan. Wood pillow, broken,

*Australia.*

5 Boomerangs. Quartz knife. Stone club. Nulla nulla. Dress of cords. Net.

*New Guinea.*

2 Drums, one with rattles. Many bags, spears, spatulas, adzes. Dance paddle. Fringe dress.

*New Caledonia.*

Short adze and greenstone disk club.

*New Britain.*

14 Stone disk clubs; 2 Star clubs.

*Micronesia.*

Kalo hoe of turtle bone. Large mat made for Kamehameha V., given by W. T. B. Small mat. Spear with two guards bound with pandanus. Many shark teeth swords. Shell sticks for dances. Shell money, Gilbert Islands. Shell adze, Yap. Coconut fibre cord covered with pandanus braid. Niue club, Solomon Islands bows and arrows, Gambier Islands paddle.

Professor Putnam's Assistant Mr. Frank Willoughby was at the time rearranging these specimens in a new hall.

The Peabody Institute and Marine Museum at Salem was visited with Prof. Edward S. Morse who was familiar with the whole establishment. It was impossible in the limited time to do more than look at the specimens from the Pacific Region, but those brought home by the old Salem shipmasters for the most part, are of good quality and great interest.

*Hawaiian Islands.*

Niho palaoa. 2 Kupee puaa. 5 Huewai pawehe. 5 Ie kuku.

Many good kapas. Large idol of ohia wood from Hawaii*. Pl. XIX. Cups and drinking vessels of Alaskan basket work, said to have belonged to Kamehameha III.

*Fiji.*

24 Clubs, throwing; 10 clubs, pineapple; 13 musket; 2 lotus; 10 knobbed. 5 War paddles and several fine spears. 2 Temple models.

*New Zealand.*

Carved sword with shark teeth. 3 Mere of whale rib. 7 Mere of greenstone. 4 Patu of carved wood. 3 Tewhatewha. 3 Carved fifes. 1 Trumpet. Bailer. Door cap.

*Marquesas Islands.*

6 Clubs. 11 Paddles. Stilt-rest. 3 Gorgets covered with *Abrus* beans.

*Hervey Islands.*

Carved food scoop. 3 Paddles, usual form.

*Samoan Islands.* Human figure of carved wood.

In Chicago the Field Columbian Museum was visited. While the collection is rich in many departments, it has little of importance to illustrate the Pacific Region.

*New Caledonia.*

2 Death masks. Club of greenstone. 5 Bird-bill clubs. 2 Adzes. A Samoan Upete of wood cylindrical surface, 40 inches long, was interesting. A Fijian Yaqona bowl; New Guinea clubs of usual form, a few Australian implements are about all.

Mr. W. H. Holmes, the Curator and Mr. G. A. Dorsey his Assistant were both very courteous in showing the museum. The Anthropological arrangements in charge of the latter, were well planned and thoroughly carried out. It is to be hoped that such valuable collections may soon have a building more substantial than the one left by the late Columbian Exhibition.

In the Mormon Museum in Salt Lake City are two small Hawaiian idols given by Kalakaua, and of which the Bishop Museum has photographs. Fig. 71.

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*Only three of these images are known to exist, the one in the British Museum (Pl. XIV); this at Salem, and one in the Bishop Museum (7654).

The Hall of the California Academy of Sciences in San Francisco contains:

*Marquesas Islands.*

Double idol of stone, small size. 2 Casts of similar idols. 4 Casts of stone idols, present locality of originals not stated. (Voy Collection. Carved wood images. 3 Human hair armlets with bone cylinders. Carved coconut cup. Wooden bowl with two carved human figures for handles at each side, 35.8 in. in diameter, 8 in. deep, 2 in. thick, of heavy unknown wood. 3 Old men's white beards used for ornaments. Coconut water bottle in net. Stilt rest. 2 Stilt rests of white wood (models). Large drum 22 in. high, 16 in. in diameter at the base.

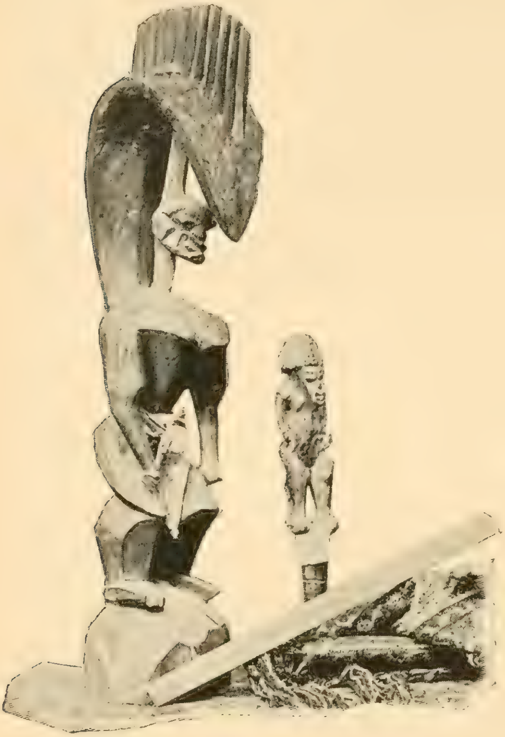

Fig. 71.

*Fiji.*

2 Pots of good workmanship. 5 Throwing clubs and a pineapple club. Stone adze.

*Hervey Islands.* Paddle and 2 carved adzes.

*Solomon Islands.* Spears and bows and arrows.

*Admiralty Islands.*

Food bowl, round, 48 inches in diameter, damaged.

*Micronesia.*

Coconut fibre armor swords and knives of shark teeth from the Gilbert Islands.

*Australia and New Guinea.*

Stuffed specimens of Cassowary and Emu.

*New Hebrides.*

Pseudo mummy with human skull from Mallicolo*.

These lists will roughly represent the collections of material accessible to students. The number of specimens remaining in private hands as curiosities is very limited if exception be made of showy clubs, canoe models and the like. It will be seen that in all museums weapons predominate. Spears are very numerous for they are from their length inconvenient in private houses. There are perhaps weapons enough preserved in museums to arm every able bodied native in the Pacific region at the present day. The following is an approximate estimate of the number of certain prominent articles to be found in museums:

| | BISHOP MUSEUM. | ELSEWHERE. |
|---|---|---|
| Dried Maori heads with Moko (Gen'l Robley) | | 50 |
| Hervey Islands Ceremonial Adzes | 2 | 40 |
| " " " Paddles | 4 | 50 |
| Heitikis, New Zealand | 3 | 71 |
| Pump Drills | 6 | 27 |
| Hawaiian Feather and wicker Helmets | 2 | 30 |
| " " Cloaks | 6 | 27 |
| " " Capes | 6 | 55 |
| " " Gods | 2 | 9 |
| Vitian Clubs, Musket and Lotus | 8 | 247 |
| " " Pine-apple | 2 | 92 |
| " " Knobbed | 4 | 159 |
| " " Throwing | 15 | 210 |
| " " Round | 4 | 103 |
| " Pots | 7 | — |
| Solomon Islands Arrows | 150 | 6000 |
| New Caledonian Disk Clubs | | 40 |
| " " Death masks | 2 | 25 |
| Marquesan Clubs | | 34 |
| Hawaiian wooden idols | 25 | 40 |
| " stone idols | 20 | 18 |

It may be of little use to estimate the number of specimens representing the island groups of the central Pacific, but it may show to some extent the material available for study from each group. It should be remembered that the Melanesian or Papuan races are more extensive manufacturers than their Polynesian

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*These figures are covered with seaweed, and moulded with a mixture of red cane ashes kneaded with unripe coconut water. When this is dry a priming coat of the juice of the *Artocarpus* and then painted with ochres, etc.

neighbors. Of the latter the Hawaiians made the greatest variety of articles, the Maoris the best carvings, although the Hervey Islanders pressed the Maoris close in quality of work, but by no means in variety.

A curious observation was made that the cannibals did better work than those who did not love their fellow men in that way. The cannibal theory is one of absorption of the qualities and faculties of the eaten by the eater: hence the natural desire to eat the bravest of one's enemies even if the musculature be very tough, and a genuine cannibal will not eat a woman or child unless pressed by hunger. The Maoris, Fijians, Solomon Islanders, New Hebrideans and Marquesans were the most thorough-going cannibals, and they were the best workmen in the Pacific, and their products are the most sought as curiosities.

With the exception of the Maori heads there is no collection of tatued skins shown in any museum, although in a German medical museum was seen an album of tatued patterns found on the white subjects in the dissecting room, and in the Warren Medical Museum in Boston was a fine specimen of a complete Marquesan(?) tatued skin. Yet the art is dying out with the compulsory adoption of clothes and the significance of the elaborate patterns used by the Marquesans, Hervey Islanders, Samoans* and others will soon be lost. When the unfortunate Samoan governed by a very "mixed" commission is fined 7/6 every time he is caught bathing without a lavalava or waist cloth, he must abandon the elaborate skin decoration he can no longer exhibit.

Again what do the museums show of the cookery of the Pacific Islanders? It was not the simple matter often supposed, and a cannibal feast was a most elaborate affair. The *imu* or earth oven of the Hawaiians and others was a most capital thing, and the ovens for baking "long pig" were both ingenious and suitable. The preparation of "made dishes" was an art practised by all Polynesians, and the artificial preservation of food was well understood in Micronesia and elsewhere.

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* F. von Luschan. *Beitrag zur Kenntniss der Tätowirung in Samoa.* Berlin, 1897. This very interesting treatise on Samoan tatuing should be followed by a similar investigation of the more elaborate work of the Marquesan and Aitutakian tatuer. The Samoan men that I have observed in four visits to Samoa were quite as well decorated as in Dr. von Lushan's plates, but the contrast of colors is not so harsh as when reduced to black and white.

Then the medicine of these peoples does not exist in any museum, with the exception of one or two surgical appliances from the Hawaiian Islands in the Dr. Arning collection at Berlin. It is war, war, war all the time: clubs, swords, spears, arrows, slings and shields form the vast majority of specimens in all museums, and yet these war-like people did not fight all the time. Certainly the Polynesians were a race fond of sports and had many games, but with the exception of the dancing appliances there is hardly a hint of these in museums, except at Berlin. In no museum was any attempt made to illustrate the manufacture of kapa or bark-cloth the universal Polynesian clothing, so far as any was necessary. It is true that in most of them kapa beaters and stamps as well as the finished material are found, but they are never brought together, and a visitor or even a student would be puzzled to make out the connection between the *disjecta membra* of the complicated process.

Idols abound, but they are not distinguished from mere images like those from Rapanui (Easter Island) which are not objects of worship, or those from New Guinea which are Penates. Everywhere they are simple curiosities. The missionaries to the Pacific did not, like those who invaded Mexico, destroy everything that had what they considered the Devil's mark, but they sent home to London and to Boston specimens with more or less explanation, and it is not on them but on the museums that the blame must rest if this information is often lost with the labels. The London collection has greatly enriched the British Museum, and the one gathered in the Boston Cabinet has come to the Bishop Museum. In the latter place it is intended soon to show the modes of worship and the place of some of the "forty thousand and four hundred thousand gods". Much is known of the Pacific theogony but no museum has imparted this knowledge; it has come from Turner, Gill, Codrington and other missionaries.

The method adopted in Paris, Washington and New York as well as in the Bishop Museum* of making casts from life of natives in their peculiar occupations cannot be too much praised, only it will never do to make the casts from poor wretches traveling with some show, or dying of disease in some hospital. It would be desirable for several museums to combine and send to the Pacific a sculptor competent to select and cast and color good specimens of the races fast disappearing from their island homes. The Bishop Museum is doing this for the Hawaiian Islands, who will undertake the other groups?

It was found that very few museums had a system of photography; indeed the Museum für Völkerkunde at Berlin where the accomplished Dr. von Luschan is a skilled photographer was the only one prepared to exchange photographs of its contents. And yet this seems a very important adjunct to museum work. If all important articles were photographed and the negatives kept and classified as a card catalogue might be, Curators would be saved all farther trouble or risk in disturbing large specimens when application is made to photograph them. By a system of exchange of prints students in any one museum could easily see what in the lines of their studies was to be found in other museums far better than any catalogue, however explicit, could inform them. Then as very few ethnological museums have printed catalogues that are more than mere lists, the need of good photographs becomes more imperative.

The question has often been asked what sizes of plates should be used, and it may be answered that for all useful purposes the sizes in use at the Bishop Museum seem most convenient. The largest plate 8×10 inches is suitable for illustration full page size of ordinary quarto publications and for maps; the next size 5×8 is the best for landscapes, views, groups, full-length figures or portraits front and profile on one plate, or for three views of any object (as crania) on the same plate, or for full-page illustration, octavo size; in fact it is the plate most generally useful. The smallest, 4×5 is of great convenience for single objects. One good 8×10 camera can be utilized for all these sizes in museum work, but for the field two cameras 5×8 and 4×5 should be used; the smaller is much the best for catching groups, peculiar postures or occupations. An experience of thirty-five years in practical photography, photographic journeys in Central America and across the American continent, camera work in the tropics and on mountain tops nearly 14,000 feet high, leads to the belief that 5×8 is the largest size to be taken into the field, and that only for stereoscopic work or several pictures one plate. For views the 4×5 size is ample, as with a good enlarging camera all reasonable sizes can be obtained from that. The slowest plates that the subject admits of are best.

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* The casts already made for the Bishop Museum include a *Kahuna* or native priest in he solemn act of "praying to death"; a powerful man in the prime of life scraping oloná; a young boy and a full grown man pounding poi; a girl of eleven years and an old woman beating kapa. All these are well colored and wear the dress of ancient times.

Prints for museum exchanges should be on bromide paper unless needed for reproduction in which case a smooth surface silver print is more desirable. Bromide prints need no mounting but can be bound directly as book plates or illustrations.

In regard to exchanges we are unfortunately situated since there are no European or American museums that have duplicates from our region that we do not already possess. Exchanges of photographs and of publications are however readily arranged, and as soon as the Bishop Museum can issue the first part of its Memoirs, exchanges will commence with nearly a hundred scientific societies and museums whose publications are needed in our library.

As to the installation of exhibits, no halls were found so well lighted as ours or more accessible for visitors; no cases better suited to the needs of this climate than those now in Polynesian Hall. The iron cases in the Berlin Museum are excellent, but although more expensive are certainly not ornamental. The system of plate glass shelves there in use has been discontinued owing to the great expense and liability to breakage in readjusting exhibits, disadvantages found to more than counterbalance economy of

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For a studio camera I have found the American Optical Co. No. 22 Imperial camera, 8x10 size with Waterbury curtain slide holder the most convenient. It is sold by the Scovill and Adams Co., New York.

space and additional lighting facilities the glass certainly affords. With plenty of light about the case wooden shelves do very well.

In labels the greatest deficiency is shown in almost all European museums, even the great one at Berlin cannot be entirely excepted. The expense of properly printing labels is certainly considerable, but the information that a comprehensive label legibly printed can afford is worth all it costs. Many of the large museums have their own presses worked by one of the regular assistants. One museum in the colonies which had well-printed labels on many, but by no means all, of its large exhibits, had spent several hundred pounds on the work which was done outside. By the use of a Golding Pearl Press any of the labels can be printed as needed and much time saved in correcting printer's mistakes in the technical words generally in use. This will require a large variety of type but only small fonts of each kind: Book plates, notices and lists of duplicates or exchanges can easily be printed on such a press and a very complete outfit would cost less than $400.

Type-written labels and those made with rubber stamps are unadvisable as the aniline inks used with these will certainly fade in sunlight, even if not direct, at least in the tropics.

The American museum in New York was by far the best equipped with labels of any museum visited, and the Boston Society of Natural History has also good labels. In the former institution the printing is done outside, in the latter a printer has been for years employed not only to do the printing of labels but also to attend to the composition of the many publications of the Society, the presswork and binding being done outside. With good labels an expensive catalogue which in a growing museum is soon out of date may be dispensed with.

How to increase the museum exhibits and obtain desiderata is a most important question and needs great consideration. Certain articles that can now only be found in large museums may be

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Since this report was written the Bishop Museum has been provided with such a press (Golding & Co., Boston, Pearl No. 3) and type not only for the labels (many of which have already been printed) but also for the publications of the museum. The label printing has proved a great success. This report and other publications are composed in the museum office; the presswork is done outside.

represented by casts or photographs, but the many things not in this museum but still obtainable may be purchased in some cases of the dealers but generally must be collected either by our own or the explorers for the other museums who have duplicates. In the latter case we take the leavings at the cost of the best; with our own collectors we reverse the situation. The purchase of special collections is often best in economy, but the best of all, and if wisely done not the most expensive way, is to do one's own collecting, for then every specimen has attached to it a surprising fund of information and is not simply a curiosity. Your trained collector sees for himself how each thing is used and generally can obtain its name in the vernacular. If Ethnology is to progress in the Pacific Region this course must be taken, and this Museum which is the largest in this region should undertake at least its share of this work. As the English Scientific Societies sent a trained collector to gather the Hawaiian Birds and Insects, so the Bishop Museum must send one or more men to the groups where vernacular implements are fast disappearing. The Marquesas, Fiji, Hervey, Tonga and Society Islands will have little to show the Ethnologist ten years from now.

This journey has shown how little is to be obtained from other museums, and it has as clearly demonstrated that the needs of this and other museums must be supplied from the islands themselves if at all. And although there are many things in attics and private cabinets that will by gift or purchase come to this museum, they will be dead things no longer able to tell their name, use or origin, and the money spent for such things, yes every dollar, should be appropriated to the expenses of a collector.

As to the Natural History of our region Mr. Perkins' admirable work here has shown what treasures there are even in a region so long known and so accessible as the Hawaiian Islands. Groups like Fiji and the Society Islands would probably be nearly as rich. If all the birds and insects of the chief groups in the Pacific, even omitting Australia, New Zealand and New Guinea, were represented in our cases we should have room for them and do no more than the position of the Bishop Museum demands. It was impossible to examine the Natural History collections thoroughly for specimens from the Pacific: that would be a work of many months. London and Paris have the largest lot of Polynesian plants, although Cambridge (Massachusetts) has a large number of species. Berlin and other museums probably lead in Ornithology, while the marine species are tolerably distributed among the principal museums of America. Corals abound in the British Museum and in the Museum of Comparative Anatomy (Agassiz) at Cambridge, Massachusetts.

Another important object of this journey was an examination into the feasibility of establishing a Marine Zoological Station here as a branch of the work of this Museum. Of the advantages of such an institution to science and to this country nothing need be said. Of the desirability of such a Station to the Museum it may be said that without it the latter institution would require a very large outlay for collecting the Hawaiian Marine Fauna, without considering the expense of preserving and exhibiting, and the salaries of experts to determine the species collected. Another large building would be required as well as considerable accommodation near the shore. The proposed Station or Laboratory would do all this besides relieving the museum of some of its present collections, thus giving additional shelf space. The possibility of its establishment depends wholly on the amount of money that is available for the purpose. This country is remarkably rich in marine life, the climate is admirable, the site accessible to the world. Lines of steamships could bring to our tanks marine life from the East Indies, China, Japan, Fiji, Australia, New Zealand, Mexico and Central America, without passing through a cold climate. Instead of exciting jealousy on the part of older establishments, the project meets warm encouragement and approbation from all whose encouragement and approval are most worth.

Plans have been prepared, which will in due time be submitted to the Trustees, for a large and imposing building of stone to contain a tank-room with fourteen tanks for the public exhibition of marine life, the growth of corals, etc.: a museum room to contain the preparations to illustrate marine life in the Tropics: a spacious hall between these wings for smaller, fresh water tanks, ferns and plants, and to be used as a general resting room. These will occupy the ground floor and alone be accessible to the public. On the first floor will be the library, microscope rooms and a number of laboratory tables and tanks. One or more detached buildings will contain pump rooms, sorting chambers, food tanks, and above stairs laboratories. A light railway will extend from the wharf through the sorting and food rooms to the tank room or Aquarium. These subsidiary buildings whose plan will depend on the location of the institution will contain Preparator's store and work room, store rooms for glass, dredging and diving apparatus.

The first work to be done will be a very thorough exploration of the shores and reefs of this Group, although this will not of course be continuous work. The tanks in the Aquarium will require some time for the specimens to become established and fit for exhibition. This is especially the case with Actinias, Corals and many of the lower forms of marine life. There will be discovered many new species which should be published as speedily as possible in the Memoirs of the Museum, and be fully illustrated. The Aquarium will require a complete photographic outfit distinct from that of the Museum, as all new forms brought in by the collectors should be photographed while alive or at least while fresh, and an artist who is a good colorist should be permanently employed for this work. Very likely the artist in colors and the photographer can be the same person. The Director has already devised simple apparatus for the convenient photographing of fish, etc., in tanks either by sunlight or the electric light.

Another employee of constant importance is the Tankkeeper. It is his business to feed the animals, keep the tanks in order and look after the supply of water and air to the study as well as the exhibition tanks: the position requires knowledge as well as industry, and he will need an apprentice. The Preparator will be a man skilled in the preparation of specimens for exhibition, and it will not only be his duty to prepare specimens for the museum, but to pack and forward all specimens and material to be sent to other museums, and in this department there will be many exchanges.

A competent engineer to look after the pumps, filters, valves, etc., will be required, as well as one for the steam launch. It will be best to use for the pumps an electric motor, and if the building is within reach of the town water supply no pumping of fresh water will be required. With an electric motor and other modern appliances the engineer of the boat will serve in the other capacity also, and he will have an apprentice. A steam launch of such character as is used by the United States Fish Commission at Wood's Hole* and elsewhere, built by the Herreshoffs, and one or two small naptha launches, to serve as tenders and plankton gatherers, will be needed, but the latter can be run by members of the staff of students.

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*I am advised by Prof. A. Agassiz that a larger boat, 80 feet on the water line and 20 feet beam, will be better for Hawaiian waters.

The Library will be an expensive and very important part of the establishment. While current publications will flow in with the exchanges, a large number of very expensive books will have to be purchased, and at least $20,000 will be required at the start. This should be in charge of a permanent Librarian and arrangements should be made to extend its use to any scientific students not directly connected with the Station so far as possible.

Then for the staff. A man used to marine biological studies, preferably one at the head of a similar institution, should be appointed Dean with at least three scientific assistants, the number to be determined as the work progresses, or as desirable persons offer. It may be admitted here that many applications have already been received so eager are scientific men to take advantage of the facilities for the study of tropical marine life that the proposed station would offer.

There must be a general Janitor or caretaker of the buildings and as the public rooms will always be open to the public, there must be a principal attendant to sell catalogues or guide books, look after dogs, sticks and umbrellas, with an assistant for the Tank room and Museum. A man to keep the grounds in order, and several hands for the steamer while dredging.

This is of course but the skeleton, and a disjointed one at that, of the possible Hawaiian Marine Biological Station, or as this is a very long name like that of the Bernice Pauahi Bishop Museum it might be well to call it the Bishop Aquarium, but it will simply show the Trustees that this part of his mission was not entirely neglected by the undersigned who presents this report.

WILLIAM T. BRIGHAM.

December 14, 1896.
Honolulu.

# OCCASIONAL PAPERS

OF THE

# BERNICE PAUAHI BISHOP MUSEUM OF POLYNESIAN ETHNOLOGY AND NATURAL HISTORY.

Vol. I. — No. 2.

## Director's Report for 1899.

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HONOLULU, H. I.:
Bishop Museum Press.
1900.

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# Director's Report for 1899.

HONOLULU, H. I.:
BISHOP MUSEUM PRESS.
1900.

*To the Trustees of the Bernice Pauahi Bishop Museum.*

*Sirs:—I herewith submit my Report on the work and condition of the Museum for the year 1899 in accordance with the vote of the Trustees at the meeting of January 13, 1900.*

*WILLIAM T. BRIGHAM,*
*Director of the Museum.*

*Honolulu, January 30, 1900.*

# REPORT.

IN inaugurating a system of Annual Reports of a more formal character than has hitherto obtained during the few years since the opening of the Museum, it may not be out of place to state the nature and objects of this institution. In the Deed of Trust under which the Museum was established by Charles Reed Bishop the Trustees are directed to apply "*the net income (a) in and toward the maintenance, conduct and (to such extent as they shall in their absolute discretion think fit) further equipment and development of the said Bernice P. Bishop Museum as a scientific institution for collecting, preserving, storing and exhibiting specimens of Polynesian and kindred Antiquities, Ethnology and Natural History, and books treating of, and pictures illustrating the same, and for the examination, investigation, treatment and study of said specimens and the publication of pictures thereof, and of the results of such investigation and study, and (b) if the said Trustees or their successors in the trust, shall in their absolute discretion think fit, in the purchase or lease of suitable site or suitable sites for, and in the erection, furnishing, equipping and conducting also as a scientific institution, on the Island of Oahu, Republic of Hawaii, a Marine Aquarium and Biological Laboratory, but the trust in favor of the Bernice P. Bishop Museum shall always and in all things have precedence and be paramount over the trust in favor of the said Marine Aquarium and Biological Laboratory.*"

Working in these lines the Museum has "preserved, stored and exhibited" such specimens as have come to it by gift or purchase, and as will be seen by the lists of accessions during the past year many specimens have been added in this way, but in the first work "collecting" in its true sense little has been done except in the Departments of Entomology, Ornithology and Radiata since the establishment of the Museum. It is true that the collections have grown, but it has been mainly by purchase, to a small extent by gift, and as yet no collectors have been sent to the other groups of this Pacific region. This omission it is hoped may be remedied in the near future. A beginning was made in 1896 by sending the Director around the world to examine the ethnological collections in the principal museums, and to study especially the objects from the Pacific Region, many of which can no longer be obtained in the place of their original use. If of no other material advantage to this Museum, the extensive although hasty journey showed plainly what had been done in other museums, and by inference what remained undone in the Bishop Museum. It strengthened the hope that one day, before the changes of civilization make it too late, the Natural History at least of the Pacific Region may be properly explored. In the Ethnology much has irrevocably passed away, much is passing, but it is not too late to gather material for comparison and study in many of the islands of this great ocean. In many of the groups of the south-eastern Pacific kapa making is still practised, tatuing is not a lost art, and at the other extreme geographically cannibalism is as rife as ever.

Although not feeling prepared to begin the work of collecting independently, the Trustees welcomed the opportunity offered by the Committee of the London Royal Society and the British Association for the Advancement of Science, and by furnishing one-third of the funds needed for the exploration of these Hawaiian Islands, became a third partner in this important undertaking. Mr. R. C. L. Perkins has for several years collected and studied the Hawaiian insect fauna for this Committee, and has incidentally collected a number of Hawaiian birds. The results of Mr. Perkins' explorations are now being published and distributed to the correspondents of this Museum. It is hoped that our future explorations may be extended to other groups, but in such way that the collections may come to the Museum in their entirety instead of being shared with two other partners.

In furtherance of the plan for a Marine Zoological Station the Legislature set apart a tract of some twelve acres of land at the mouth of the harbor, at that time admirably adapted for the purposes of such a station and the only place suitable within many miles of Honolulu. Unfortunately an iron foundry and boiler shop has been erected on adjoining land, quite unfitting the place for study or any of the serious purposes of such an institution. The United States Government has since taken possession of the whole tract. In consequence the second branch of work indicated in the Deed of Trust has fallen into abeyance.

In turning to the record of this year's work I must pause to express the sorrow of the entire Museum Staff at the loss of the Reverend Charles M. Hyde, D.D., who as trustee has early and late taken a most lively interest in the work of the Museum. His help, advice and sympathy have always been with us and he was one of the earliest among our citizens to appreciate the advantages of a large public museum. His knowledge of Hawaiian character and customs was wide and deep. Much of this he has bequeathed to the Museum in his papers and annotated dictionary, but no material bequest can replace the constant interest with which he encouraged all workers at the Museum.

**Buildings.** Since the completion of Polynesian Hall, the first addition to the original Museum building, it has been felt that better accommodation should be provided for the Hawaiian portion of our collection, and through the generosity of Mr. Bishop at the end of the last year the contractors began the erection of a wing larger than the entire existing building. Work has continued on this during the year, and alterations consequent on this large addition have compelled the withdrawal of much of the Hawaiian Department from public view, and the disturbance incident to any large building operations has in various ways interfered with the regular work, and in the attendance of visitors which is less than in 1898. A large workroom with skylight has been built for photographic purposes as well as for the arrangement of large groups of Hawaiians cast from life by Allen Hutchinson, and for the construction of models of Kilauea and of an ancient heiau or temple. This is a most convenient addition to our workrooms. Cases have been placed in the basement of Polynesian Hall for the temporary storage of books. The Picture Gallery has been improved by the closure of unused windows and the removal of a wall-case thus giving more wall space. Four brackets for busts have been placed in the corners. To the pictures in this room have been added four of D. Howard Hitchcock's capital paintings of Kilauea and Mokuaweoweo, a number of Mr. H. W. Henshaw's platinotype photographs of Hawaiian scenes, and some good photographs of Maoris. During alterations a portion of the Hawaiian collection has been exhibited in table cases in the Picture Gallery.

The attendance is checked off each public day and an enumeration of nationalities made, and in a town of such mixed races this is both interesting and instructive. In giving the table below it should be stated (what the figures do not show) that many of the schools both public and private have availed themselves of the instruction the collections afford, and many hours have been spent in the Museum supplementary to the regular school exercises. By means of an abundance of plain printed labels information has been placed within the reach of all visitors except perhaps a few of the orientals. The hours have been from 10 to 5 during the summer months and from 10 to 4:30 during the winter, on Friday and Saturday; and also to accommodate passengers on the through steamers the Museum has been open on the days these steamers are in port.

## TABLE OF ATTENDANCE.

| 1899. | Whites. | Hawaiians. | Portuguese. | Chinese. | Japanese. | Others. | Open Days. | Visitors on Closed Days. | Totals. |
|---|---|---|---|---|---|---|---|---|---|
| January ...... | 372 | 55 | 22 | 79 | 36 | 5 | 8 | 17 | 569 |
| February ...... | 518 | 79 | 3 | 181 | 47 | ... | 8 | 20 | 819 |
| March ........ | 472 | 79 | 7 | 75 | 66 | ... | 10 | 6 | 699 |
| April .......... | 649 | 61 | 7 | 95 | 51 | ... | 11 | 20 | 854 |
| May .......... | 378 | 63 | 67 | 40 | 31 | ... | 12 | 18 | 579 |
| June .......... | 366 | 151 | 27 | 142 | 73 | ... | 12 | 34 | 759 |
| July .......... | 531 | 60 | 9 | 75 | 88 | 21 | 15 | 36 | 784 |
| August ........ | 470 | 61 | 49 | 93 | 74 | 3 | 17 | 84 | 750 |
| September .... | 348 | 180 | 37 | 117 | 79 | ... | 15 | 21 | 752 |
| October ...... | 353 | 113 | 10 | 58 | 26 | 4 | 13 | 46 | 564 |
| November .... | 380 | 107 | 14 | 59 | 75 | 2 | 11 | 24 | 629 |
| December ...... | 396 | 111 | 20 | 55 | 53 | 6 | 9 | 24 | 641 |
| Totals ...... | 5224 | 1111 | 272 | 1060 | 691 | 41 | 141 | 350 | 8399 |

It has been customary to close the Museum on Public Holidays, but the Trustees voted shortly before the end of the year to keep the Museum open on all holidays except Thanksgiving and Christmas. On two holidays thus open a solitary visitor came in for a few minutes.

Classes from the Government Normal School have spent some time at the Museum making drawings of native implements. The attendance of visitors has been most satisfactory considering the distance from town, the bad road, and unsatisfactory tram car system.

At the beginning of the year the Director was without assistance in the Museum work owing to the resignation of the Curator Mr. Acland Wansey. February 15 Mr. John F. G. Stokes, who had been appointed Assistant some time before, arrived from the Colonies and at once took hold of his work with vigor and interest. During the year in addition to his duties as acting general Curator he has filled the post of Librarian. Mr. Allen M. Walcott had been appointed Assistant while as a member of the First Colorado regiment in service in Manila, and he arrived August 14 and he has since been busy in the general care of specimens. The Museum had long been without a Taxidermist and much material in this department had accumulated. The delay in filling the vacancy was due to the difficulty of getting someone who was more than a mere "stuffer" of birds. Modern taxidermy demands an understanding mind as well as deft fingers, and a knowledge of and sympathy with Nature. The Museum has profited by the delay, for in the selection of Mr. Wm. Alanson Bryan of the University of Chicago (who arrived September 27) we have chosen a taxidermist fully able to meet all the needs of the Museum. Soon after his arrival, on the recommendation of Mr. Bishop, Mr. Alvin Seale was appointed collector of birds, a work in which he had already acquired an enviable reputation. He arrived November 8. It is expected that when the shore and sea birds of this group have been obtained, he will go to other groups and add to our collections. It is especially desired that the sea birds of the Pacific should muster in full force in our cases, and for this end an expedition to the Farallones of the Marianas and to the Chatham Islands would be most desirable. In the meantime Nihoa should be visited for the many species that breed there undisturbed.

In the spring the Trustees requested Dr. William H. Dall of the United States National Museum to visit the Museum and examine critically the collection of shells made by Andrew Garrett and increased by various purchases and exchanges. August 16 he arrived and for two months made a most careful study of the collection and his notes and corrections are in hand with a view to the rearrangement of the shells in the most approved modern manner, and also to the publication of the catalogue. His report to the Director is as follows:

BISHOP MUSEUM,
HONOLULU, SEPT. 1899.

DR. WM. T. BRIGHAM,
DIRECTOR BISHOP MUSEUM.

DEAR SIR:—I have the honor to make the following report on the Garrett collection of shells belonging to the Museum, its condition, the work which I have done upon it, and the work which still remains to be done.

I may say by way of preliminary that I had originally intended to pass about three months at Honolulu, at work upon the collection, but, other engagements having left me only about two months for my visit to the Islands, this time was cut short. However, in the sequel this has proved not to be disadvantageous because, during the time at my disposal, I have done all that I could do here in the way of revision, and found that, to complete the work, I should require the greater facilities for access to literature and investigations not yet in print, which are afforded me in Washington. I have copied that portion of the catalogue which relates to the groups for which such reference is necessary, and will take this catalogue with me and make the revision upon it and, when completed, return it to you from Washington. By a rough calculation from averaging the entries on the pages of the type-written catalogue I find the collection contains between 8000 and 9000 species and about 25,000 specimens. Of these about one-fourth are pulmonate landshells. All are neatly mounted on card tablets with printed labels and very few are without complete identification and locality.

As might be expected from Mr. Garrett's residence and connections the collection is particularly rich in Pacific Ocean material and leaving out of consideration a few great national collections like those of London, Berlin, Washington and Geneva the Garrett is among the most complete if not actually the best supplied with the shells of the Pacific Islands. The series of landshells of the Solomon and Hervey groups is the finest I have seen anywhere, and those of the Society Islands are probably very complete.

In the marine shells the Cones and Pleurotomoids are especially rich and include many very rare forms. Scattered through the collection here and there, I have found a number of extremely rare forms which are common to only a very few fortunate museums. Several of these had been identified erroneously by Mr. Garrett or his correspondents, with more common species and the revision just made has corrected the error. A certain proportion of the species were wrongly named, which is not surprising when we consider that Garrett had no access to a large library or museum, and was obliged in great part to rely on the identifications made by more or less competent collectors with whom he exchanged specimens. A very valuable portion of the collection consists in the series of type specimens of the species described as new by Garrett and author's specimens of many of those named by the late Mr. Wm. Harper Pease. These are of course unique and essential to any thorough study of the Polynesian mollusk-fauna.

The work done by me was much facilitated by a type-written catalogue of the collection prepared by yourself, without which it is probable double the amount of time would have been required for revision. In the first place I went critically over the collection species by species to discover (1) whether the specific identifications are correct, (2) whether the species are referred to the proper groups, (3) whether any typographical errors occurred on the register or labels, and (4) whether the group names are those now adopted by naturalists. In general the species appear to be very correctly named, everything considered, though the names are not always those in use at present. A small number of typographical errors were detected, but probably no more than would be found in most collections thus labelled.

The most important part of the revision consisted in the substitution of names in current use for others now obsolete but which had been used by Garrett and his correspondents, and the correction of cases where one species had been received from different places and correspondents under more than one name. A good many such cases were found. All these corrections have been entered in red ink on the register of the collection except in cases where some more lengthy explanation seemed necessary, in which case notes were made on separate sheets of paper with cross references to the register. Similar corrections will be made by me on the copy of the portions of the register which I shall carry to Washington and a skeleton of the classification at present adopted, including families and genera in their natural order, will be returned to you as soon as completed.

With this schedule of groups and the corrections noted to the individual species in the register, the relabelling and rearrangement in modern form of the entire collection will be merely a matter requiring intelligent clerical work which may be done by any careful person whether acquainted with mollusks or not. I shall be glad, however, should it facilitate your work, to examine at any time type-written copy intended for the printer so as to eliminate any inaccuracies which might creep in.

I would recommend for the library the purchase of a copy of

Dr. Paul Fischer's Manual de Conchyliologie, Paris, F. Savy, 1888, for reference. Though like all manuals it is behind the times in some parts of its classification, yet it contains an enormous volume of facts and many illustrations. It is almost indispensable as a book of reference and costs only some thirty francs.

To supplement Tryon's Manual, which does not cover the bivalves or the fresh water and terrestrial pectinibranch gastropods, probably the best iconography is the new edition of Chemnitz' Conchylien Cabinet, edited by Dr. W. Kobelt.

As a work giving the latest information on the anatomical side the best is the new edition of Bronn's Klassen und Ordnungen der Thierreichs, Molluska, edited by Dr. H. Simroth. The possession of these three works will put the library in a position to meet any demands from students which are likely to be made on it for some years to come.

Very respectfully,

WM. H. DALL,

Palæontologist U. S. Geol. Survey; Cur. Dept. Mollusks,
U. S. Nat. Mus., Washington, D. C.

Dr. Dall, who at the conclusion of his visit met the Trustees and accepted the title of Honorary Curator of Mollusca, prepared a completely corrected list, in which all changes of name to suit modern views are noted, and the material so arranged that it will be possible to print the catalogue of what, in the opinion of Dr. Dall, is a remarkably good collection, especially in the shells of the Pacific Region. When these changes can be adopted and new labels printed we shall have nearly 10,000 species arranged in the most modern way. The duplicates are being arranged to facilitate exchanges, but the native Achatinellidæ, which are most in demand, we have not enough of for exchanges, nor can they be properly determined until Messrs. Sykes in London and Pilsbry in Philadelphia, who are now studying the family, shall have given us the result of their labors which will doubtless relegate many of the present species to the rank of varieties. The list of accessions in this Department will appear later on.

**Publications.** During the year the Trustees authorized the publication of the first part of the Memoirs of the Museum containing an illustrated account of Hawaiian Feather Work by the Director. The edition of this work was limited to 300 copies.

The exchanges established by means of our publications have already brought good returns: in no case has an exchange been declined, and it will be seen by the list of exchanges appended that many of the most important institutions pursuing the same lines as this Museum are there represented: some of their most valuable publications are already on our shelves.

During the year nearly 12,000 labels were printed for the Conchological Department and many hundred for other departments. Large general labels, notices, receipts, tables, letter heads, book plates, etc., have kept our printing office busy, and it has been a very necessary assistance to the work of the Museum. The outfit has proved sufficient, and well suited to our needs. The work of this office has called forth very gratifying approval from some of the best judges abroad.

**Ethnological Department.** Early in the year we received from a gentleman on the island of Malekula, New Hebrides, a collection of remarkable interest. The sacred tree drums of the New Hebrideans have long been known to ethnologists, but I have seen only one in any of the museums of Europe or America,—that in the Musée de Marine in the Louvre. We have now two fine specimens. What the wood is I am unable to say, but it is of remarkable hardness and high specific gravity. The labor of excavating the interior through the long longitudinal slit which is only two inches wide must have been excessive. The drums are placed in Polynesian Hall and one is shown in Fig. 1. The total height is 9 ft. 8 in.; circumference at base, 43 in.; length of slit, 47 in. The drum not figured is smaller, the dimensions being 8 ft. 3 in. high, 31 in. in circumference, slit 39 in. long, 2 in. wide. Photographs are in the Museum collection showing groups of these tree drums, and the manner of beating upon them by stones wrapped in kapa or other vegetable fibre. The sculpture of the head is broad and rude but evidently follows some canon as there is a strong family likeness. Idols are made in similar fashion but without the void within. Two large idols carved from tree ferns accompany these (Fig. 2). They are worshipped by the sacrifice of pigs, and in some of the photographs the porcine bones of the offerings mount to the chins of the figures. The face is decorated with color of a chalky nature broadly laid on. As the images stand the fern is inverted, the root mass serving for head. One image is 7 ft. 10 in., the other 7 ft. 4 in.

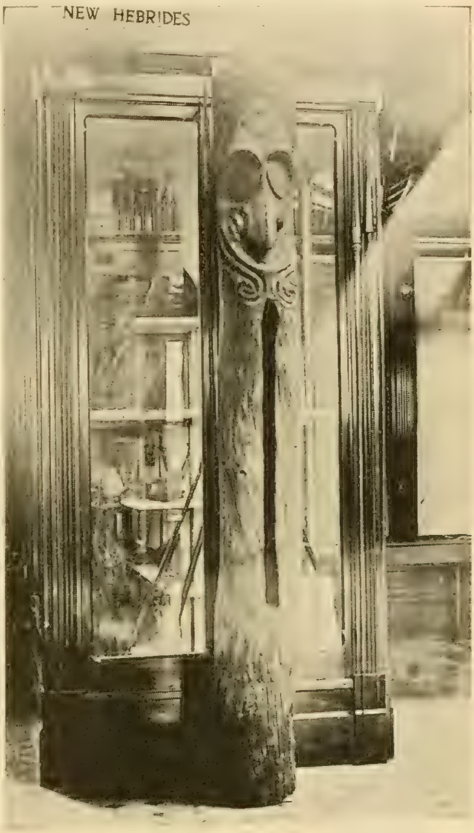

FIG. 1.

Four figures of a processional nature, made of bambu and twigs, with caricatures of human heads. Two of these (Fig. 3) have human crania with the facial region covered with some plastic material, and the nose is inordinately prolonged as if in protest against the niggardly allotment of Nature. The third has no human bone but cotton wool simulates it. The fourth is of a phallic

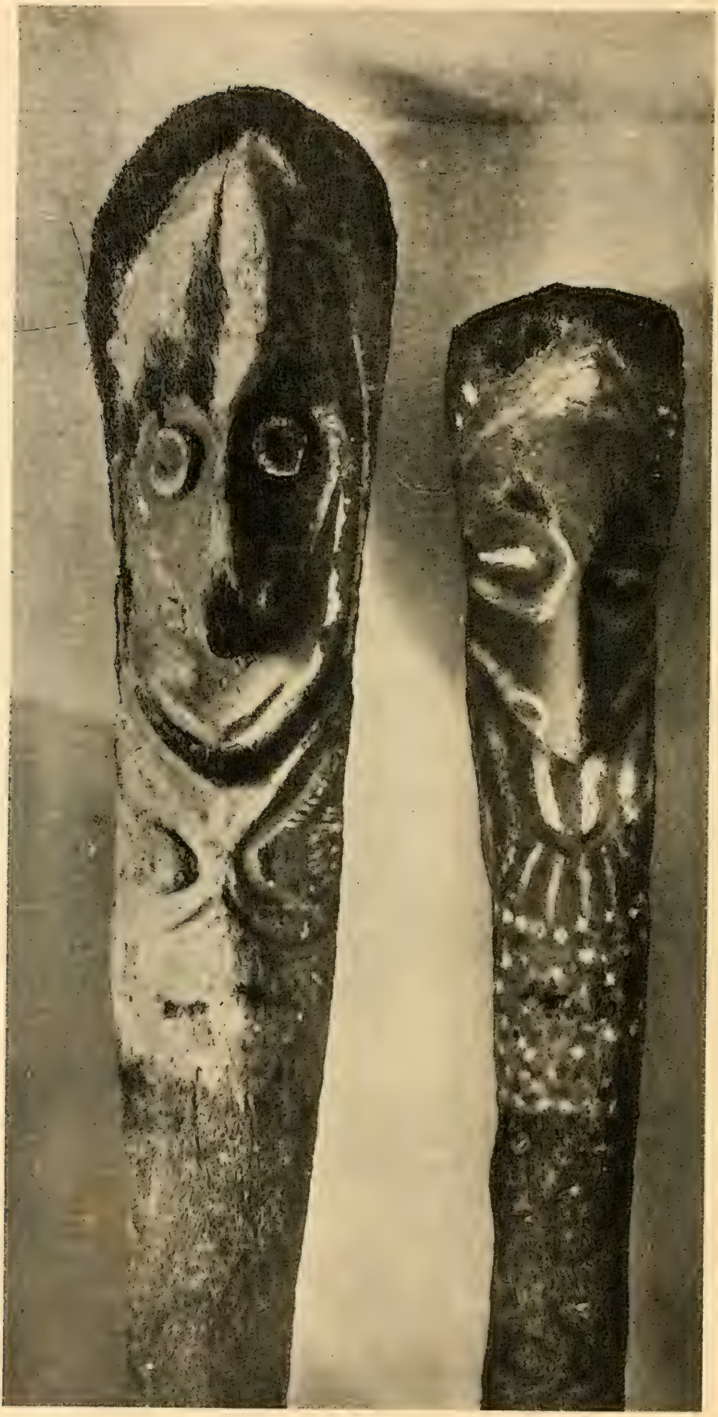

FIG. 2.

nature not unlike those used by the Japanese in certain festivals. These Malekulan images were, when exhibited in public, adorned with fern fronds and hibiscus flowers, the frames lasting for several occasions. With these came some very neatly woven mats used for women's dresses, scant but sufficient. Very important were a complete skeleton of a Malekulan man and the skull of a woman. The former has been admirably mounted and will be a most interesting member of the collection it is hoped to have of all the diverse tribes and races in this region. The female skull shows a curious

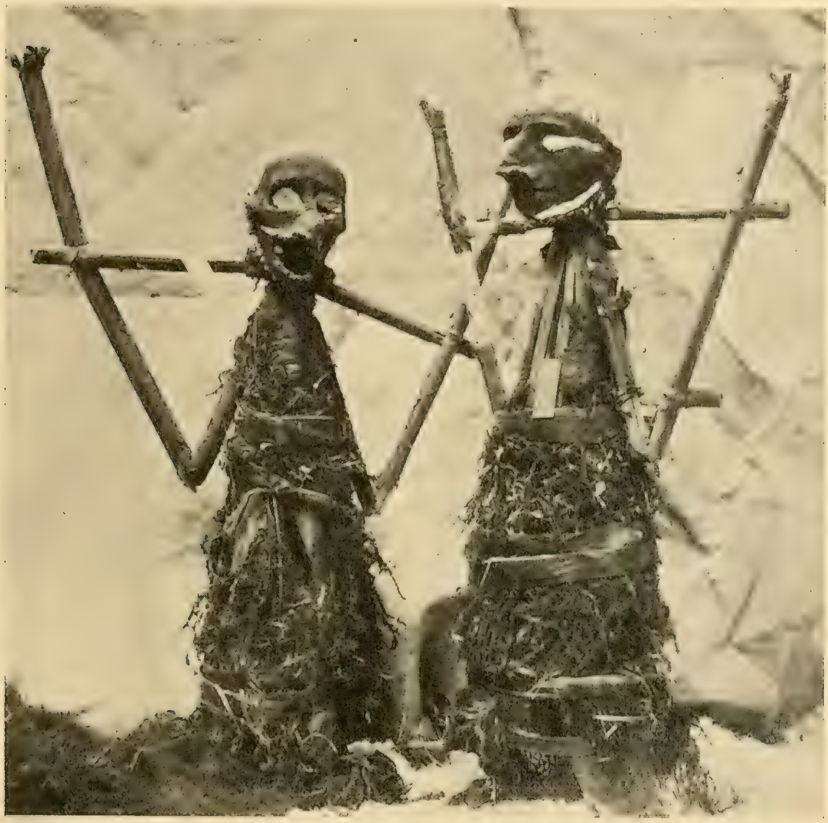

FIG. 3.

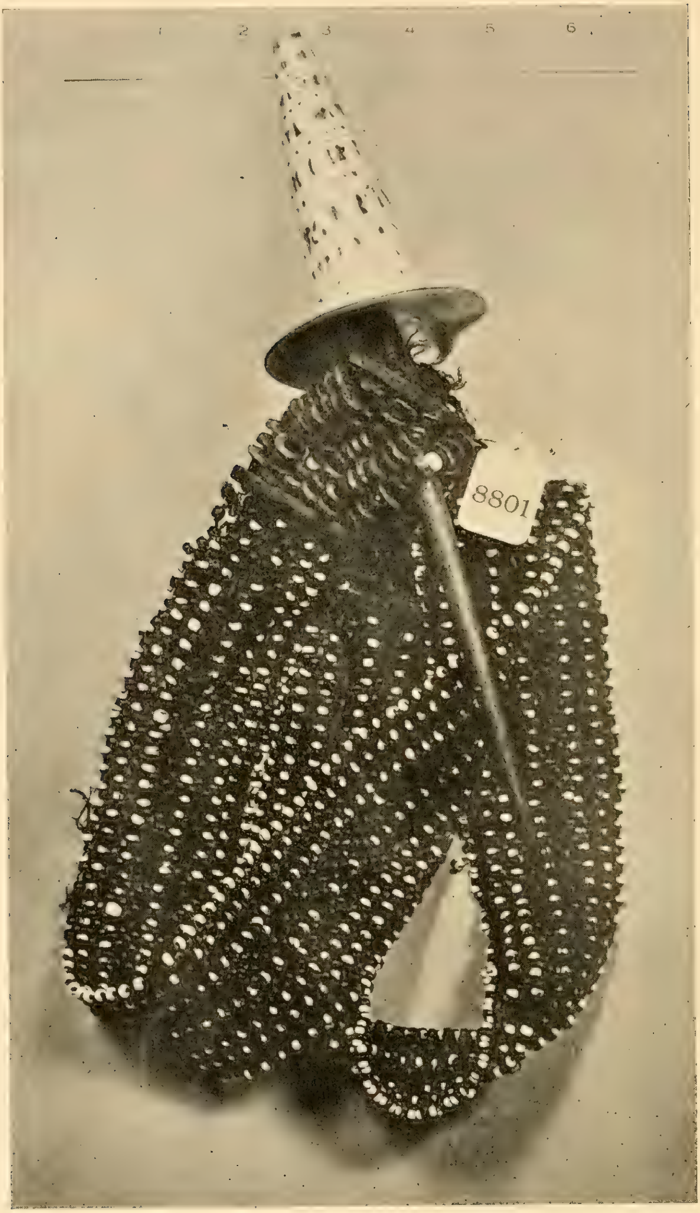
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FIG. 4.

feature: we are assured that it is customary to extract the four upper incisors as an ante-nuptial precaution, and our skull is then that of a married woman. We have been promised a complete female skeleton.

From the Chatham Islands we were fortunate enough to procure a collection of implements made nearly forty years ago by an old resident. Since then an agent of an English museum has swept the group bare. Moriori implements are very rare in collections and the people are nearly extinct. In many of the specimens the Maori resemblances are plain, but the collection seems worthy of a more complete exposition and illustration than can be given in the limits of this report.

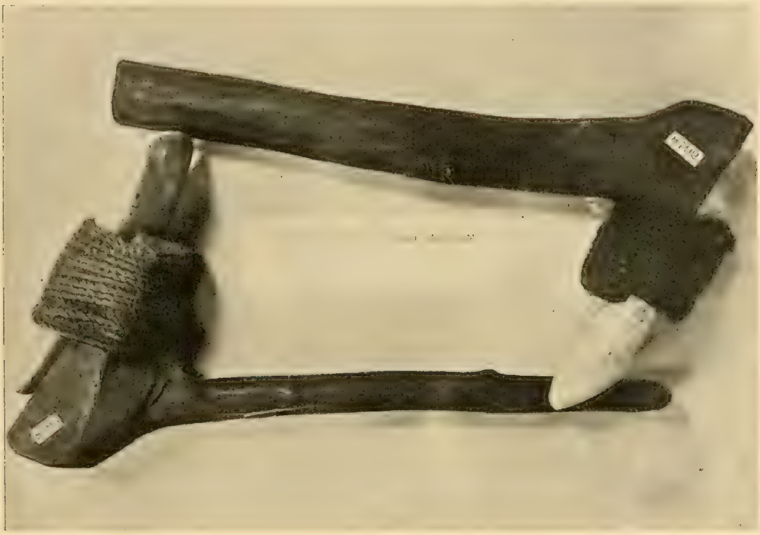

FIG. 5.

Usually we have been dependent on the "Morning Star" for Micronesian specimens, but this year we have obtained from another source several good things that were not in the Museum. A curious hairpin (Fig. 4) with a *Terebra* shell truncated and cemented with a resin to a polished *Meleagrina* shell for a top, and a band of beads of coconut shell and the red Spondylus so prized in the Carolines. A good series of rasps (Fig. 10) and two shell adzes (Fig. 5) from the Gilbert Islands, and several good shell necklaces were also added. In the Hawaiian matters we have received by the kindness of Mr. C. C. Willoughby a cast of a most interesting and peculiar stone poi-pounder which I saw in the Peabody Museum at Cambridge, Mass. A large flat stone dish (Fig. 6), once in a heiau on Molokai, is the largest worked stone dish of Hawaiian origin I have yet seen.

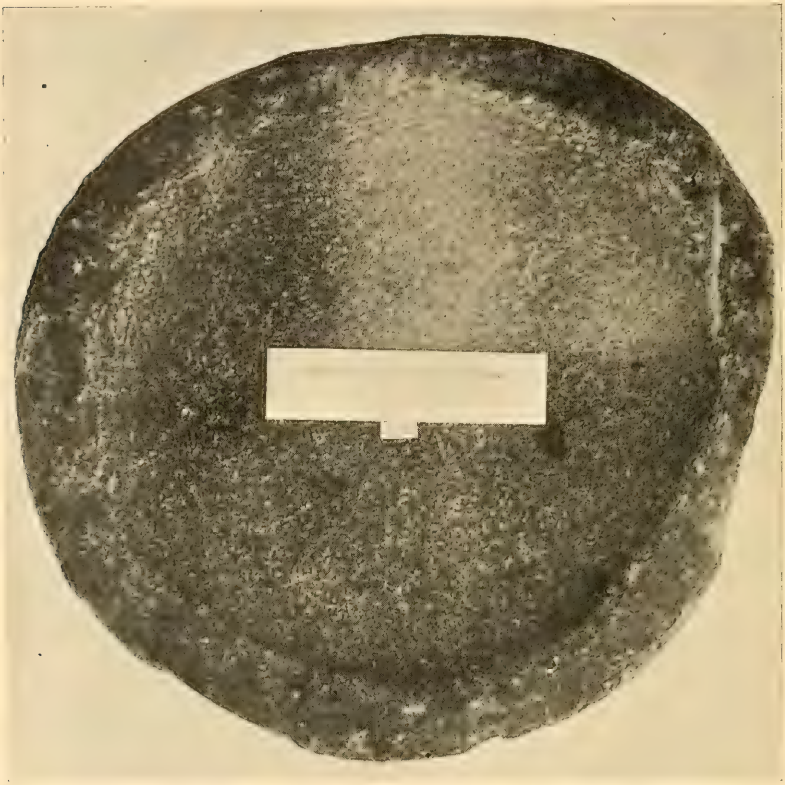

FIG. 6.

**Natural History Department.** From Mr. Koebele we obtained some fine bird skins, and from Ward's Establishment at

Rochester, New York, a large collection of palæozoic corals from the Niagara region. From the same source we have obtained an excellent series of mounted skeletons or vertebrates found in the Pacific region. Among the mounted mammals furnished by Ward's mention should be made of a fine Pacific walrus, a pair of fur seals and a sea lion. Other accessions will be noticed in the lists appended.

**As a Bureau of Information.** So far as has been possible the Museum staff have endeavored to answer questions as to matters within the province of their work. Hitherto most of this information has been sought by persons abroad, and of this two illustrations may be given. We have in the collection one of those most interesting stick charts (*Mede*) formerly used by the Marshall Islanders. These have become very rare as they have not been made or used for many years, and those in the museums of the world could be counted on the fingers of one hand. An officer of the Italian government sought some time ago for information concerning this, and lately a distinguished geographer of Hamburg has requested and obtained photographs and such information as was available. So far as I am aware our specimen is the best known, and we have also in necessary complement a model of the stick compass used with the mede. This compass has not been noticed by most of those who have studied the mede, and we owe it to Dr. Hyde's painstaking that this was obtained and its use learned from Marshall Islanders who had not forgotten the arts of their ancestors.

In the United States several machines have been invented for winding thread and cord in fancy patterns, and one form was found desirable because it was most stable and kept its form until nearly unwound. In litigation over the patent it was suggested that this was a method of winding well known to this region, and on appeal to this Museum photographs were sent which determined the matter. The peculiar wind is interesting and as it is wide

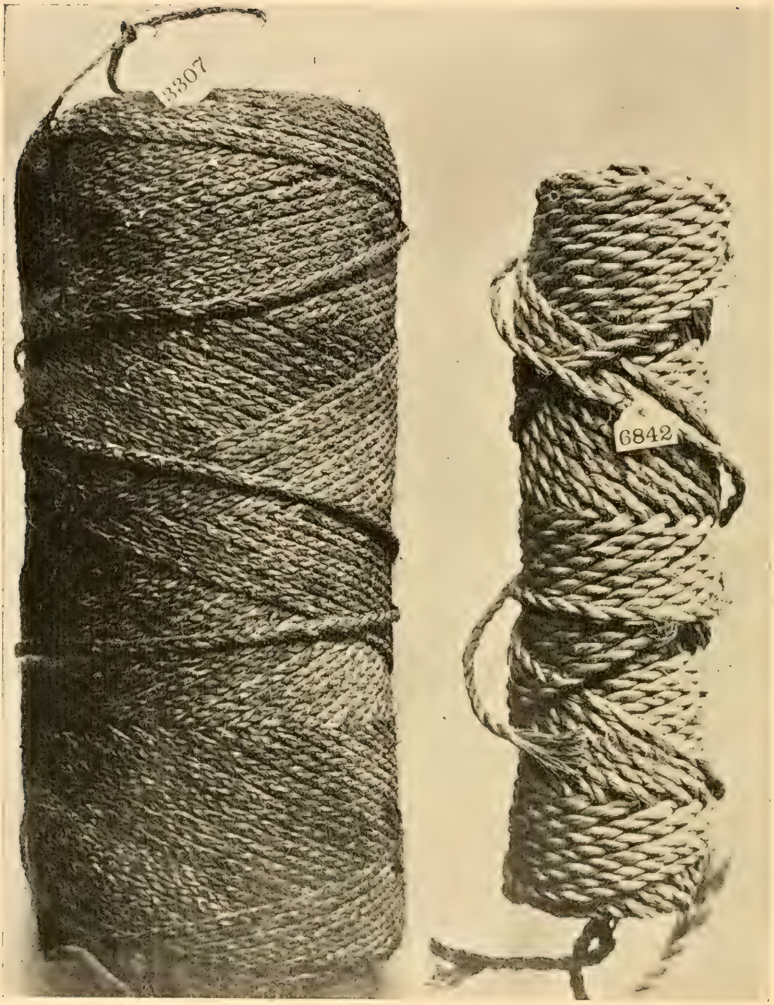

FIG. 7.

spread through Polynesia and Micronesia I give illustrations (Figs. 7 and 8) both of the coconut cord and of the imitation of the inventive American. Many can remember in the early days of the Micronesian mission Honolulu was well supplied with the trim rolls of coconut cord and sennit brought by the "Morning Star."

Much less success has attended the efforts of the Director to obtain for the information of visitors products of these islands. The collection of samples is growing slowly but not by the help of the producers who should be most interested. No plantation has ever sent a specimen of sugar, rice, tea, fibres or fruit. I have by purchase in the market or by the kindness of individuals collected a number of typical products which will be on exhibition when cases are provided for Hawaiian Hall, and it is hoped that then colored casts of the many tropical fruits raised in private gardens may be added to the exhibition. Moulds of a number of rare fruits have been made by the Director.

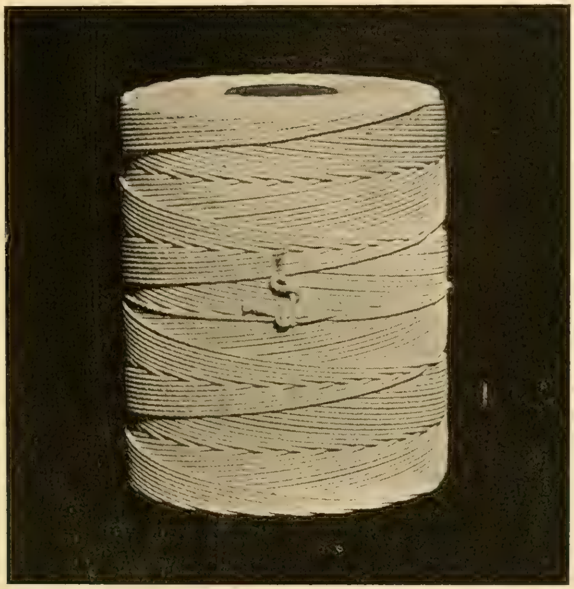

FIG. 8.

**Exploration.** In October, with Mr. J. F. G. Stokes, the Director at the instance of the Trustees visited Hawaii to measure and critically examine the heiau of Wahiula, a temple originally built by Paao when he made land in Puna and twice rebuilt. It was the last to yield to the advance of Christianity, and as it is in a remote and unfrequented place the remains are in comparatively good condition and have been used neither for goat pen nor cattle corral. The measurements and observations there obtained are now being embodied in a model of the restored ruins. A more detailed record of the survey will be reserved until an illustration of the restored heiau can be prepared.

From the extreme of Puna we next went to Kilauea where during ten days of perfect weather we photographed the walls of the crater from nearly fifty different positions on all sides of the circuit, and also made barometric observations to check levels. This material will be utilized later in preparing a relief model of Kilauea on a scale of $\frac{1}{1200}$. In eighteen previous visits extending over thirty-six years I have never seen the volcano so dormant: It shows signs of entering into a solfataric condition which would be most unfortunate for Hawaii. Many specimens of lava were collected and by the kindness of Mr. F. Waldron of the Volcano House some large and splendid specimens were added to our collection. Plants were not neglected and photographs of both Waoke and Mamaki, the two principal plants used in kapa-making, were secured. Specimens of these and other plants were added to the Herbarium. It was interesting to note how completely the Japanese raspberry has become naturalized along the roads nearly to the crater of Kilauea. It grows and bears in great luxuriance and although its large fruit is not of first quality it is pleasant to the taste and might, it would seem, be improved by judicious crossing. The extension of plantations to within a few miles of the volcano has destroyed the wild and beautiful scenery in great part, and where sugar-cane is driving out coffee the broad coarse features of the former are an unpleasant change from the fern and ohia of the old and narrow trail.

I have asked my assistants to notice for this Report some of the specimens that seem notable. Mr. Stokes has also prepared a complete list of the Corals, both palæozoic and recent, in our collection, and of the library accessions as well.

# THE MAT SAILS OF THE PACIFIC.

By John F. G. Stokes, Assistant in the Museum.

Of the useful arts in the Pacific Ocean mat-making was, in former days, one of the most universally practiced, the materials used being the leaves of the *Pandanus odoratissimus*, Hibiscus and banana fibre, the fibre from the *Phormium tenax*, commonly known as the New Zealand flax, and the sedges *Cyperus lævigatus* and *Scirpus lacustris*. Of these the Pandanus was in greatest request, growing as it did most spontaneously throughout the tropics, and existing in barren parts where most other plants would die. Being an evergreen with abundant foliage the supply of material never ran short. When prepared the leaves were very soft and pliable, yet having sufficient stiffness to retain the strips in position when weaving. The Hibiscus (that mainly used being the *Paritium tiliaceum*) was also plentiful, but more work being required to prepare it and the mat woven therefrom not being equal to the Pandanus mat, less use of it was made. Only two or three species of banana were grown for their fibre and these were limited to the Caroline and Gilbert Islands, and while making a wonderfully fine mat—one that appeared quite as fine as our coarser linen—it was not as strong as Hibiscus or Pandanus and was manufactured mainly as an article of dress. The New Zealand flax was the best known fibre in that country, but its use was confined to New Zealand. As a durable article it has attracted the attention of European and American manufacturers. The sedges, *Cyperus lævigatus* and *Scirpus lacustris*, while no doubt growing elsewhere, were not used except on one of the Hawaiian Islands; and there, on account of the extreme softness of the material the mats were very largely manufactured for the clothing of the chiefly families; but on account of the natural conditions surrounding its growth it could never compete with the Pandanus in general usefulness.

It will thus be observed that of the plants known to the inhabitants of the Pacific Islands that most in demand, and which proved itself most suitable to the wants of the multitude for the purpose of making mats, was the Pandanus, and the mats made from it being so strong and pliable were always used (apart from New Zealand) to supply the sails of their canoes. When visiting Samoa, La Pérouse described a kind of linen, stating: "This is made of real thread obtained, no doubt, from some fibrous plants, like the nettle or flax, and is manufactured without a shuttle, the threads being passed between each other as in making mats. This cloth, possessing the strength and pliability of ours, is well calculated for the sails of their canoes........" There can be little doubt that this material was made from the bark of the Hibiscus, which on being bleached and pounded by a process known to the Samoans, somewhat resembled coarse flax fibre. However, there has been nothing to prove that this cloth was ever used for sails, and La Pérouse is the only authority, ancient or modern, who suggested the possibility of its being so utilized. The Maoris, of New Zealand, used a sail of thick cloth or mat made in a frame from New Zealand flax. This was the only fibre known to them.

The mode of preparing the Pandanus leaves was similar in all the islands and the following description will suffice: The prickly edges were plucked off with a shell, and the leaves then rolled up and baked in a native oven. After baking they were strung together and placed in the sea to bleach for five to seven days, and then rinsed in fresh water and placed in the sun for drying and further bleaching. When thoroughly dry they were slit into thin strips with another shell, which made them ready for the weaver.

When not weaving mats for sails the custom was for the weaver to commence on the square base of the mat and after weaving a strip of the proposed breadth, to continue to weave forward until the required measurements were reached. This necessitated the spreading out of the entire work over a level space on the ground, and the weaver was obliged to move along as the mat grew. Of course these mats, made for sleeping or wearing, it was necessary to weave in one piece, but with the matting for sails the process was simplified for the weaver, the mats being woven in pieces of many shapes, which being of small size could be easier handled by the maker. The sails throughout Micronesia were always made in strips varying in width from four inches to three feet, the Micronesians being particularly apt in this form of mat-making. The Marshall Islanders, who are among the most expert canoe builders and sailors in the Pacific, use a lapboard cut from breadfruit wood (*Artocarpus incisa*) on which the mat is woven. The board is arched and sets very comfortably in the lap of a person sitting on the ground. The strips of matting as woven are passed from the board and neatly rolled up. The accompanying illustration (Fig. 9) shows one of these boards and a sail strip, both being ex-

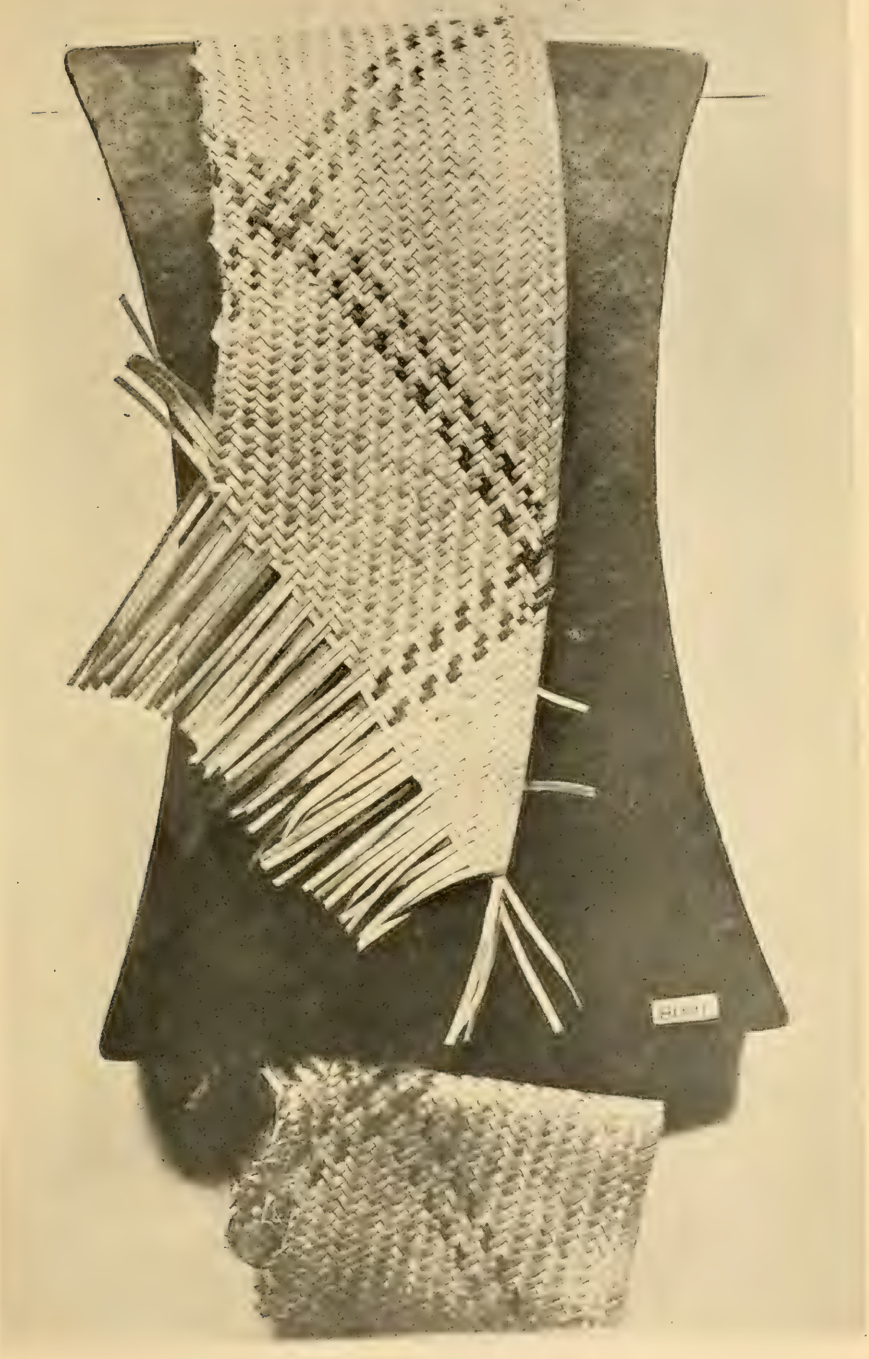

FIG. 9. BOARD FOR MAT WEAVING.

hibits in the Bishop Museum. The strip of mat has four dark strands of dyed Hibiscus fibre woven in on top of the usual strands of Pandanus; this is a favorite method of ornamentation among the Marshall Islanders. The weaving commenced on the left side, and the strands were cut to about twenty inches in length, being long enough to pass round the three strands of Pandanus used to form the border at the right and reach the left edge again, where after being woven in about half an inch they were trimmed off. It might be noticed that at regular intervals along the left-hand border some strands were allowed to protrude; at this edge, as stated, the fresh strands were applied, and when secured four ends out of every seven were trimmed off; the three remaining butts being left to guide the weaver in inserting the black ornamental strands. This strip is 4¾ inches wide, while the breadth of the strands varies from $\frac{3}{32}$ to ⅛ inch.

Having woven a great length of sail the strips were placed together with edges overlapping and sewed with a thread made from coconut fibre or twisted Pandanus, the ends of the strips, on the edges of the sail being turned under and doubly sewed with the coconut fibre, which material is also used to bend the sail to the spars. A sail made in this fashion is very strong and will stand a great strain. It is about twice as heavy as an ordinary mat, and little heavier than canvas, and if wet becomes dangerous to use when suspended from the mast. The Micronesians in a rain storm prefer to lower the sail and roll it up in an envelope of Pandanus or banana leaves which they generally carry for that purpose.

The Hawaiian sail was made in strips, but that of Tahiti seems to have been composed of several large square mats sewn together, and could not have been a very strong combination. The New Zealand sails were made of strips of the "flax" matting or cloth and sewn together, and a handsome pattern of ornamentation frequently introduced, *i.e.*, that of the "bent knee." In all cases the work of weaving devolved on the women, while the men attended to the sewing and shaping of the sail.

The question may arise, "Why was it necessary to use mats of any kind for sails? Was there no other material?" The only other material within reach of the Pacific Islanders was the paper cloth beaten out from the bark of various trees and called Kapa in the Hawaiian Islands, and Tapa or Siapo by other Polynesians. This cloth was not tough or durable, and could stand little wear even when dry, while were it wet the fibre would soon become disjoined and the kapa be dispersed.

Who taught these people the use of the sail and whence they procured their patterns is as much conjecture as is the origin of the Polynesian race at the present day, but it might be interesting here since it is generally conceded by competent authorities that the Polynesians emigrated from some part of Asia, to give short descriptions of the sails of the east coast of this continent, with those of the Islands, made principally long before the time when the influence of European civilization began to dominate the races which are considered inferior. The authorities here quoted are the voyages of the earliest European navigators, but great difficulty has been experienced in gleaning information concerning the sails from even these; for, while the canoes in nearly every instance took the fancy of the voyagers by their novelty, the sails were passed by with but a word.

The Chinese sail has retained its shape since the first visit of the Western civilizer, until very modern times, that seen today being practically the same which Anson saw on his visit: it was a large trapezoidal sail, the breadth being less than the length, made of mats woven from rattan (*Calamus rotang*) into long strips the length of the sail—stretched across the sail parallel to the top yard and deck were bambu poles about three feet apart; the reason for this being to strengthen the matting, and also no doubt to prevent the sail bagging and carrying dead wind. The sail of the Japanese was of a shape known as a square sail, attached to a large yard at the top of a tall mast, its length being perhaps half as long again as its breadth. This sail was composed of long narrow strips of cloth running the length of the sail and laced together. It was admirably suited for moving before the wind, but for tacking was useless. In Formosa and the Liu Kiu Islands the sails are after the fashion of the Chinese, but the Liu Kiu people have also been known to use sails of cloth. In the Philippine Islands, when at Manila, La Pérouse portrayed "A Parao or Passage Boat of Manila" having two sails almost identical with those of the Chinese, and being undoubtedly of Chinese origin. Throughout the Malayan Archipelago mat sails were used, there being one general form for all—a rectangular or rhomboidal sail bent to a yard and a boom, and constructed of strips of mat fastened together. It had, with few exceptions, the breadth greater than the length, and was generally slung from the mast at a considerable height from the deck, with the after part of the sail raised above the fore part. This pattern was found to the eastward as far as New Guinea, but at various localities the rig was modified. At Amboina in place of one mast two were erected and bound together at the top, resembling closely sheers used for raising the mast out of a vessel. At Port Dorey and other settlements on Northern New Guinea three masts were fixed, in a straight line, with the upper ends fastened together. This sail was not seen east of New Guinea. Making another commencement on the south coast of New Guinea a sail entirely different was seen. The shape of this may be said to have resembled an attenuated arrow head with the haft removed and the tips of the thin barbs contracted. The sail was provided with a sprit and a boom of equal length, the sprit being about twice the height of the mast and having the lower end stepped in a chock on the deck near the foot of the mast. The sailing canoes were double and sometimes treble, and carried two or more sails. The shape of this sail held with little variation among the islands to the eastward almost as far as Fiji, and then became merged into the triangular sail of the Fijians. The people of New Hebrides had a sail shaped just as on the south of New Guinea, but the mast, stepped on top of a house built on the deck inclined forward to lie almost horizontal, and served more as a support for the sprit than an appliance from which to fly the sail. The New Caledonian sails were simply described as triangular. The sails of Fiji and Tonga resembled those just described as regards the spars, but the ends of the sprit and boom were wide apart and the sails extended flush with the extremes.

To the north and north-west of Fiji, among the Gilbert Islands, Micronesia and the Marianas, the sails were more of the latteen type than any others in the Pacific, but differed from the latteen in having, besides a sprit or yard, a boom of almost equal length. These sails were suspended from a mast which was set on a platform built on the beams of the outrigger and standing directly over the gunwale next the outrigger. Of course there were minor differences in the proportions peculiar to the many islands, but the distinction was more marked in the rigging and build of the canoe than in the sail. These vessels sailed close to the wind, and were shaped bow and stern alike. When tacking the helm was put up instead of down, and the sail being shortened by rolling up partly the heel was lifted from the notch it had been set in and carried to the other end where it was again fixed—the sail being kept to leeward of the mast. For the purpose of shortening sail two ropes were passed through the masthead and fastened to the boom, one on each side of the sail. It might be well to mention that the outrigger was always kept to windward of the hull when sailing, for if to leeward the weight of the wind might easily force it under water and a capsize would promptly ensue. The mast in some places, the Caroline Islands notably, was inclined forward with the sail, and with each tack the stays were loosed and the mast moved, the masthead always leaning in the direction of the boat's course.

The Gilbert Islanders, besides the sail here described, which was used for the larger craft, possessed a small sail bent to a mast and a boom, the boom being fastened to hang at an angle of 50° to the mast. This sail was used on a small canoe for a single individual and was a simple sail for one man to work.

The Tongans had been noted sailors for many years, but they admitted having acquired their proficiency through the Fijians, whose methods and pattern they had adopted, and were considered by some to have surpassed their preceptors. The Fijians early made trading voyages to Tonga and Samoa, and while the Samoans were reputed to have built wonderful vessels in ancient times and to have led expeditions to far distant lands, our early explorers seemed to have little opinion of the Samoan vessels. Cook named Samoa the Navigator's Islands, not from what he saw, but from what the natives told him. Two kinds of sails have been found at Samoa; one was large and shaped like that of the Fijians, through whom no doubt the pattern originated, and the other was like that used on the Gilbert Island small canoe, and might properly be considered as the type of the older Samoan sail. There are old legends inferring that the Maoris of New Zealand set out from Samoa, and it should be here remarked that the sails described in "Cook's Third Voyage" and by d'Urville in the *Astrolabe*, and figured in the voyage of the *Coquille*, are of the same shape as the Samoan lastly described.

The sail of the Society Islander was in the shape of a half moon. A sprit or boom was fastened to the mast near the foot and curved upwards to a height a third more than that of the mast, which was vertical, the upper end of the sprit being directly over the masthead. The sail thus being enclosed in a case, and practically a fixture when set, was awkward to work and when a squall came it was necessary to keep the head of the vessel to the wind, for which purpose several of the crew jumped into the water and swam at the bow. The only means of reefing was to unloose the sprit at foot and roll the sail around it. During squalls capsizes were not uncommon and the means employed to right the vessel were thus: After making everything fast the head of the sail was brought to windward, and a line being taken from it and passed over the outrigger (which was kept to leeward) several hands, by their weight on the outrigger and pulling at the line, lifted the sail out of the water some little way; then, the wind getting under the sail righted the canoe. Some men remained in the water to keep the head to the wind, and when bailed the canoe continued her voyage. Many of these canoes had two sails.

The Hawaiian sail was shaped somewhat like that of the Society Islands, but the top of the sprit was on a level with the masthead, near which it was held by a cord. The leech of the sail dropped gracefully between these two points, like that of Southern New Guinea. This sail, while no doubt having an artistic appearance, was not the most effective, and as early as 1823, the Rev. Wm. Ellis in his "Tour Through Hawaii" wrote: "The sails they now use are made of mats, cut in imitation of the sprit sails of foreign boats, which they say they find much better than the kind of sail they had when first visited by foreigners."

There are two other important groups of islands to be dealt with—the Marquesas Islands and the Paumotu Archipelago. The sail of the Marquesas Islands as seen by Cook in his second voyage and James Wilson in the *Duff*, 1796–8, was not of much value to its owner, as at best it was a clumsy contrivance built after the shape of the New Zealand sail but of indifferent materials, the mast, boom and matting showing great want of care. These people in Cook's time were not such expert sailors as the other Polynesians, though Alex. Dalrymple states in his "Voyages and Discoveries in the South Pacific Ocean," London, 1770, that when

Mendaña visited the group (1595) they had much better canoes and sails than two hundred years later.

As regards the Paumotu Archipelago—these islands were little visited in former times on account of the difficulty of the navigation. The gentlemen of the Wilkes exploring expedition were the first to describe these parts, and there was no information given concerning the sails. The Paumotuans had large double canoes which traded between the innumerable small islands, and from a model of a canoe in the Bishop Museum from Manihi Island it was ascertained that the sails were similar to those of the Caroline Islands. The canoe model was made within the last twenty years, and there is little to show that the style of sail was not of modern introduction. There are two sails on the model, suspended from two vertical masts.

# RAY-SKIN RASPS.

By Allen M. Walcott, Assistant in the Museum.

Among the specimens in the Gilbert Islands section of Polynesian Hall are the four rasps shown in Fig. 10. These implements are more or less common throughout the islands of the Pacific. The outside or rasping portion is the skin from the back of a species of *Trygon* or sting-ray not uncommon in the waters about the islands. Any convenient piece of wood makes the handle and core, No. 3 having for a center a portion of the leg of a foreign chair. As this skin when dry cannot be bent readily it is, while wet and pliable, sewed firmly around the wood with coconut fibre thread. It will be seen from the illustration that the tubercles on the different rasps vary much in size, and this is due to the age of the fish from which the skin is taken.

The various grades were adapted to the work to be done. Almost their sole use was to enable the Gilbert Islanders to so shape the edges of the boards of their canoes that when sewed together they were water-tight. As the Gilbert Islands are low coral atolls the trees are generally not large enough to be used for dug-out canoes; hence the necessity for using planks. These were obtained from the breadfruit tree (*Artocarpus incisa*). For the making of the great proas, with a length of seventy feet and a

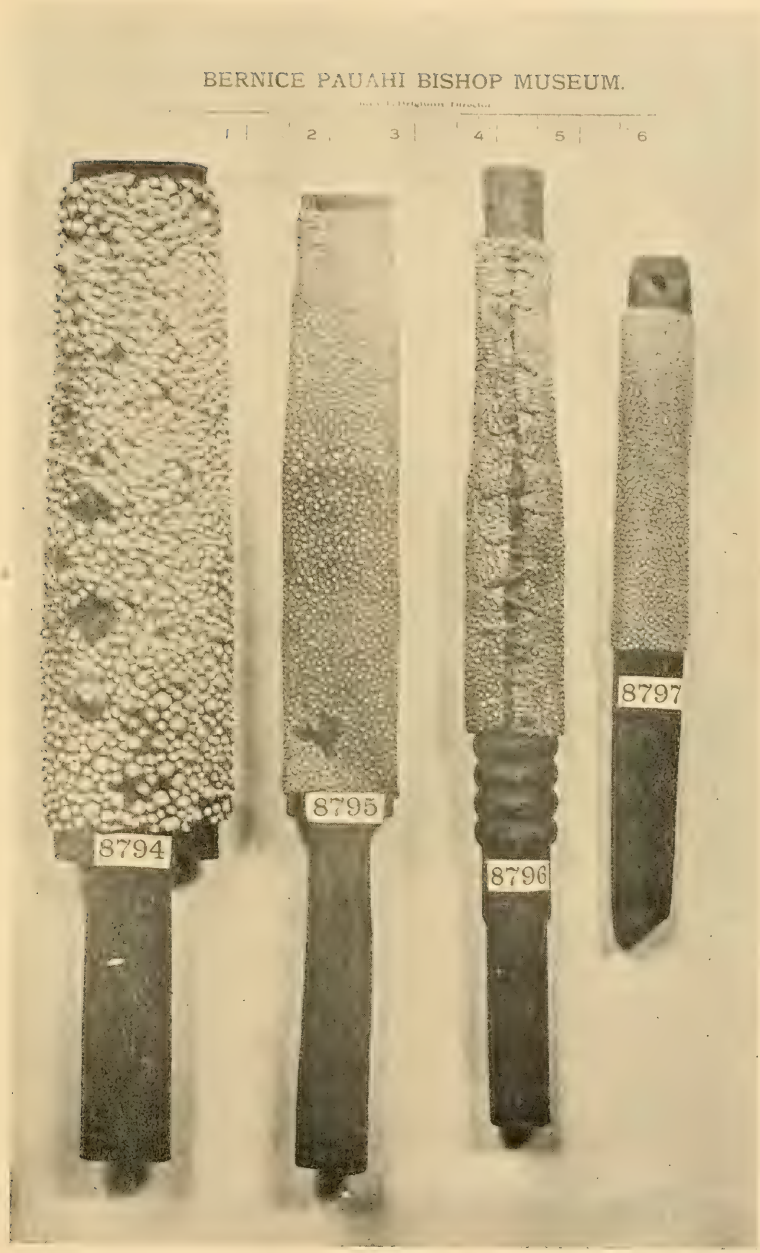
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FIG. 10. RAY-SKIN RASPS.

depth of seven or eight, the number of pieces and the work were considerable. During the building each board, before it was permanently fastened, was placed upon its lower neighbor edge to edge, between the two being a strip of pandanus leaf well covered with charcoal. In this manner the points needing to be reduced were blackened as a guide to the rasp. Such fine work was not suitable for the shell adzes of the islanders.

For many years the natives have generally used steel rasps, when obtainable, in place of their less durable ones of ray-skin. The effectiveness of the latter while it is new is quite as great as of those brought by the white man. However, the tubercles ordinarily could be used but a week at most, being often rendered useless by but one day's hard work. The native name is Tapāugu. In other island groups there were also in use, for reducing purposes, shark-skin rasps, pumice and mushroom coral (Fungia), some employing all methods while others knew of but one or two.

# FIELD NOTES ON THE BIRDS OF OAHU, H. I.

By Alvin Seale, Collector for the Museum. November 12, 1899 to March 20, 1900.

OWING to the bubonic plague quarantine these observations, since January 3, have been restricted to the immediate vicinity of Honolulu. The difficulty of collecting in these islands, with their dense tropical jungles and knife-like mountain ridges, has been mentioned by all former collectors, and I can only add, that while I have collected in difficult places before, including the boggy tundra of Siberia, the high mountains of Alaska, the Tamerack swamps of Michigan, and the Everglades of Florida, I have found nothing that could discourage an Ornithologist so much as one of these islands. The different species of land birds found on Oahu are few in number. Mr. Wilson, in "Aves Hawaiienses," gives but five existing forms, as follows:

ORDER PASSERES. FAMILY **Drepanidæ.**
Vestiaria coccinea. Oreomyza maculata.
Himatione sanguinea. Chlorodrepanis chloris.

ORDER PASSERES. FAMILY **Muscicapidæ.**
Chasiempis gayi.

ORDER LONGIPENNES. FAMILY **Laridæ.**

### 75. **Sterna fuliginosa,** Gmel. Ewaewa.

Sooty Tern.

Off the east coast of Oahu two large volcanic rocks, covering perhaps 300 square feet, arise abruptly from the water to the height of 200 feet; these rocks are about a half-mile distant from the shore, directly off Mokapu point. Owing to the coral reef, Heeia, six miles distant, is the nearest accessible point by boat. These rocks are called Moku Manu (Bird Island). I resolved at once to visit them. On January 3, taking two expert native boatmen from Heeia, I started down the coast. Long before the rocks were reached I could see multitudes of birds hovering in the air above the rocks and looking exactly like a swarm of bees. When about a quarter of a mile away I began to hear the noise and gabble. As we got nearer the big Frigate Bird (*F. aquila*) could be seen sailing about and soaring up to wonderful heights, surrounding these birds like clouds, but not arising to such great heights, were Sooty Terns (*Sterna fuliginosa*), which by thousands were the most abundant bird on the rocks. Flying among these birds were many Noddy (*Anous stolidus*), very conspicuous by their dark color.

One big Albatross (probably *Diomedea chinensis*) took flight as we were quite near the rocks; unfortunately our shot (No. 8) proved too small and the distance a little too great, as this very desirable bird merely shook his feathers to rid them of the shot and swept serenely past us, turning his head to give the boat a very sagacious look as he took his leave. Sooty Terns by the thousands were sitting about all over the rocks and flying around our boat in swarms, so near one could hit them with an oar. The din raised by their cry and the noise of their wings was so great one had to shout at the top of the voice to be heard two or three feet distant. The rocks were honey-combed with burrows and must be an ideal nesting place. I looked in vain for a landing; owing to the direction of the waves there seemed to be no lee shore; on the south side one could land on a calm day, but the sea was too high, and so the attempt to land was given up, to my great disappointment.

A good series of Sooty Terns and Noddy was obtained. One of the specimens, a male *Sterna fuliginosa*, was in full breeding plumage, the delicate bluish flush covering the entire under surface excepting the neck, which with the forehead is pure white; top of head and lores, jet black; wings, mandible, top of neck, all sooty black. This specimen's measurements* were as follows: Length, 18.25; wing, 11.87; tail, 5.19; the two outer feathers, 8.25; culmen, 1.81; its depth at nostril, .37; tarsus, .93; mid-toe and claw, 1.19. Palmer found this tern nesting on Laysan and French Frigates Shoals.

### 79. **Anous stolidus,** Linn. Noddy.

All the birds of this species shot at Moku Manu on January 4 were in dull winter plumage of uniform sooty brown; top of head hoary gray merging gradually into sooty brown on the hind neck; lores, bill, feet, wings and tail black. The reproductive organs were very minute, in strong contrast to the organs of the Sooty Terns taken on the same day. Length, 17.5; wing, 10.5; tail, 6.19; culmen, 1.64; its depth at nostrils, .37; mid-toe and claw, 1.60.

One specimen, an immature male taken at Moku Manu January 4, gives the following measurements: Length, 17.5; wing, 11.6; tail, 5.63; tarsus, 1; culmen, 1.39; its depth at nostrils, .43; mid-toe and claw, 1.46. This specimen, while exceeding the largest measurements of the adult shows unmistakable signs of immaturity in the dark line along the upper wing-coverts, a general lighter color to the plumage and a soft bill. This specimen has the gray coloring of the head confined to the forehead; supercillary stripe almost pure white; lores, black; abdomen with a decided grayish cast; faint fleckings of gray appear on the under wing-coverts; bill, black, shorter and stouter than in mature birds, with a prominent keel; wings, black; feet and tarsus a blackish brown. The mantle has less plumbous, and the wing-coverts are much lighter than in the mature bird.

### **Anous hawaiiensis,** Rothsch. Noio.
### Hawaiian Tern.

December 23, while shooting near a shallow pond on the east coast of the island, four of these graceful terns came flying past and I secured three. These have the upper part of the head, top and sides of neck, lavender gray, much lighter on the head and merging into sooty black on the upper mantle. Lores, throat, under neck, under surface of body, mantle and wings, sooty black; feet and tarsus yellowish brown; webbs, yellow; iris, dark brown.

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*The measurements in the following paper are all in inches, and together with the color markings were taken from specimens in the flesh.

The "light ashy green" on the hind neck and upper part of the interscapular region, which Mr. Rothschild speaks of in "Avifauna of Laysan," is presumably characteristic of summer plumage, as these winter specimens fail to show such coloring.

Length, 13; wing, 9; tarsus, .88; its depth at nostrils, .25; culmen, 1.53; mid-toe and claw, 1.34.

ORDER STEGANOPODES. FAMILY **Phaethontidæ.**

113. **Phaethon lepturus,** Lacép. & Daud. Haakoae.

Red-billed Tropic Bird.

Three times I have observed these birds sailing about the ridges of Waiolani mountain above Honolulu, at about 1000 feet elevation. Few birds can excel the grace and ease of this bird's flight among the cliffs of the mountains. This species occurs on all the islands.

ORDER ANSERES. FAMILY **Anatidæ.**

143. **Dafila acuta,** Linn. Pintail.

December 23, I accepted the courteous invitation of the Honolulu Gun Club to accompany them on a shoot over their preserves in the vicinity of Waimanalo. Decoys were spread in the early dawn and twenty ducks were secured. I am told this was an unusually small bag for the club, being but three ducks to the man. A large number of plover were taken, however, to make up the deficiency. Sixteen of these ducks were of the above species. The remaining four were the native Hawaiian duck.

**Anas wyvilliana,** Sclater.

This duck is fairly common on the island among the tule swamps and ponds near the coast. Length; 18.50; wing, 9.67; tail, 2.37; tarsus, 1.46; culmen, 2.12; its depth at nostrils, .61; mid-toe and claw, 1.81.

ORDER HERODIONES. FAMILY **Ardeidæ.**

**Nycticorax griseus,** Wiggl. Auku.

Black-crowned Night Heron.

These are common about the marshes in the vicinity of Kahuku. During the day they usually hide in dense clumps of trees near the coast or up the narrow cañons. One was taken at Kahuku December 31, and two were shot in the vicinity of Waimanalo December 23. Length, 25; wing, 12.57; bill, 3.19; tarsus, 3; mid-toe and claw, 3.57. This bird is found on all the islands.

ORDER PALUDICOLÆ. FAMILY **Rallidæ.**

**Gallinula sandvicensis,** Street. Alae.

Mud Hen.

These birds are common in the tule swamps, kalo patches and fish ponds all over the island. The specimens taken show a decidedly red tarsus.

ORDER LIMICOLÆ. FAMILY **Scolopacidæ.**

248. **Calidris arenaria,** Linn. Hunakai.

Sanderling.

The Sanderling is by no means an uncommon bird here during the winter months. On December 21 six were observed during one afternoon along the sandy northern shore of the island, in the vicinity of Kahuku. It is interesting to watch these little birds following the retreating wave down the sandy beach, and their active scramble for the freshly uncovered Crustacea. I have frequently seen them running along the beach with the end of the bill held firmly in the sand, literally plowing out their food. The specimens taken were all in very light winter plumage. No doubt this bird occurs on all the islands of the group, although it has only been reported from Kauai and Niihau.

259. **Heteractitis incanus,** Stejn. Ulili.

Wandering Tatler.

This bird could teach an "Ancient Mariner" many things of the sea. Its knowledge and judgment of the waves is nothing short of wonderful. They know perfectly well the rhythm of the sea, and just how many big heavy waves will come pounding over their rocks before there is a lull; this they show by running far down on the rocks after the third wave, knowing that the fourth will be smaller and not large enough to knock them from their new feeding ground. They also know perfectly well if the incoming wave is going to break or merely swell past them, their judgment in this matter being better than my own, although I have spent much time by the sea. When heavy seas were running I have been perfectly astonished at the rapidity with which they followed up the retreating waves, gathering up the dainty bits of food cast up, and judging with perfect accuracy how far they could follow down the rocks in safety before the next wave came on. They are a wary bird and difficult to approach. One has to advance when they are busy feeding, and "freeze"—*i. e.*, be perfectly motionless—when they are looking until they fancy one is a rock, their power to discriminate their enemies being less than that of the native land birds. When alarmed they fly up with a cry like U-l-ĭ-l-í, uttered in a voice clear as a bell.

During the winter months these birds can usually be found singly or in pairs along any rocky portion of this coast, being about as common here as they are on the west coast of the United States or Alaska. Three specimens were taken in the vicinity of Waimanalo December 23, and one at Heeia January 3. These were all in winter plumage and showed no signs of the barred breast markings. The nasal groove was two-thirds as long as the culmen. Length, 12; wing, 7.56; tail, 2.87; tarsus, 1.50; mid-toe and claw, 1.33; culmen, 1.63; nasal groove, 1.10.

ORDER LIMICOLÆ. FAMILY **Charadriidæ.**

### 272a. **Charadrius fulvus,** Gmel. Kolea.

Pacific Golden Plover.

During the past four months, November–March, the Pacific Golden Plover has been very abundant, especially in the rocky pastures, along the seashore, and in the inland valleys, to an elevation of 200 feet. On December 21 a walk of three miles, in the vicinity of Kahuku, resulted in seeing 205 of these birds by actual count; they were scattered about singly or in groups of three or four. These birds have a clear whistled note which changes to an entirely different and rapid alarm cry as they take to their wings. I have frequently decoyed them by throwing my hat in the air. About nightfall the plovers come in bands to feed by the shallow ponds and sloughs near the shore, a habit that results in the destruction of hundreds of birds by Still Hunters.

December 21 eleven specimens were shot along the northern shore of the island in the vicinity of Kahuku. Nine of these were males in characteristic winter plumage, showing no black on the ventral surface; the slight dark streakings on the neck merge into indistinct light brownish mottlings on the breast. It is remarkable, in contrast to this, how bright the plumage on the dorsal surface remains during the entire year. The average measurement of the nine male specimens was as follows: Length, 9.98; bill, .91; wing, 6.48; tail, 2.34; tarsus, 1.72; mid-toe and claw, 1.25; culmen, .85. The plover is found on all the islands during the winter months. I am told it leaves the islands about May 1, and returns sometime in August.

ORDER LIMICOLÆ. FAMILY **Aphrizidæ.**

### 283. **Arenaria interpres,** Linn. Akeke.

Turnstone.

In regard to the Turnstone, I have the following entry in my notebook: "Nov. 22.—Two *Arenaria interpres* were shot near a small pond in the vicinity of Kahuku; these were males in winter plumage." "December 21.—Turnstones are common in the rocky pastures near the northern shore of the island. They are usually seen in small flocks of three or four, frequently consorting with the Golden Plover (*C. fulvus*)."

These birds are quite wary and usually fly before one is within range. Twenty of these birds were counted during one hour spent in the field. All the specimens taken on this island fall short on the wing measurements. Of six specimens the longest wing was 5.61, while the average was 5.50. Length, 9; wing, 5.50; tail, 2.31; tarsus, 1; culmen, .86; mid-toe and claw, 1.19. Found on all the islands.

ORDER RAPTORES. FAMILY **Bubonidæ.**

### 367. **Asio accipitrinus,** Pall. Pueo.

Short-eared Owl.

In the vicinity of Honolulu this owl is quite abundant. My first specimen was shot November 23 at an elevation of 1000 feet. This was a male in characteristic plumage, with a very dusky frontal patch. Another specimen was taken in Kalihi valley, elevation of 200 feet. This was an adult male in the most beautiful plumage; the upper surface is much lighter than in the November specimen; the under tail-coverts are pure white merging into a very pale buffy white on upper abdomen;

dusky frontal patch conspicuous. Another, a female in very dark plumage, was taken March 15. The ovary of this bird contained twenty-one small eggs, ranging from the size of No. 6 shot up to the size of a large pea.

These owls come out about sunset and fly around near the ground, uttering every little while their cry of P-we-o from which they get their native name. I have frequently watched three or four hawking about in Kalihi valley at sunset; they sail quietly along, just skimming the tops of the low guava bushes and grass, alighting occasionally to pick up a stray insect. The stomachs of the three taken, however, were entirely destitute of food, perhaps owing to their being taken early in the evening. I have decoyed these birds within range by sailing my hat in the air. The Pueo is found on all the islands. Length, 14; wing, 12.5; tail, 5.75; tarsus, 1.62; culmen, .68; its depth at nostril, .62; mid-toe and claw, 2.

### **Chasiempis gayi,** Wilson. Elepaio.

### Oahu Fly-catcher.

This is the most common native land bird to be found on the island. One will usually see at least three or four during a day's hunt in the mountains. On March 14, a particularly favorable day, I observed eighteen by actual count. This Fly-catcher, unlike all the other birds of the island, does not regard man as its greatest enemy; a condition resulting, no doubt, from years of worship by the natives, for this bird was the god of the canoemen and gave judgment on all the timber used in boat-building. Its usual haunt is the densely wooded cañons at an elevation of from 800 to 1300 feet. It is a most active and interesting little bird and can easily be called quite near by a slight kissing sound made with the lips to the back of one's hand—a very good imitation of one of their calls. Their usual call, however, is a loud, clear whistled El′-ep-aío, from which it gets its native name. Another common note is a slight variation of the above, sounding like a whistled Tŏo-weé-oo; still another frequently heard is a sharp Wheet′, whtó. When approaching one it scolds in words sounding like Chrr, chrr. In all I have counted seven different calls or notes from this bird. They have a habit, when excited, of spreading their tail and flipping it up to almost right angles with their body. They are not at all afraid, as I have had them approach within twenty inches of my face.

The Elepaio is always keenly alert for insects, and occasionally takes them on the wing with an audible snap of the bill. In the large series of these birds taken all had their stomachs perfectly gorged with insects and larvæ. I have frequently timed them to see how many insects they really would destroy in five minutes. One feeding almost within reach of me in that length of time caught first, a leaf-hopper; second, a small moth; third, another leaf-hopper; and fourth, a caterpillar that required three or four gulps to swallow, it was so large. The strange thing is they seem to be always feeding, so the rapidity of their digestive power is remarkable. To birds other than their own tribe the Elepaio is a pugnacious little body, and I have seen them chase the larger Apapane (*H. sanguinea*) away from a particularly good feeding ground. By February 1 the mating season had arrived for these birds, and I observed them sporting with their mates. As yet I have been unable to find their nests. On March 14, however, I shot a female with an egg, now in the Bishop Museum, that was almost ready for exclusion.

This bird shows the most remarkable range of variations in its plumage, so that a very large series is required to gain any adequate idea of the age and seasonal variations. Not wishing to kill more than was absolutely necessary, the number of these birds taken was confined to six to ten each month, nothing near a duplicate has yet been found. For example, I have before me a male taken January 3: bill, entirely black; feet and tarsus, dark with bluish cast; eye, dark hazel; general color above, tawny ochraceous, brightest on upper tail-coverts and sides of neck; top of head very little brighter than mantle; the feathers of the mantle are broadly tipped with brighter ochraceous which gives the mantle an indistinctly mottled appearance; the rufous of the upper tail-coverts extends as a band entirely around the anal region of the body, although not so bright on the under tail-coverts; wing-coverts tipped with bright rufous and without any trace of white; throat, breast and flanks, tawny ochraceous; belly and tips of tail feathers, except the two middle ones, white; testes enlarged, .29 × .19. This was a bird that would evidently breed the coming season. Length, 5.16; wing, 2.63; tail, 2.25; tarsus, .93; culmen, .50; depth at nostrils, .19; mid-toe and claw, .62. A male taken March 15, with plumage exactly the same shade of color, with possibly a shade less of rufous on flanks and breast, has the immature yellowish under mandible with only the under part at tip dark. Length, 5.50; wing, 2.56; tail, 2.25; tarsus, .87; mid-toe and claw, .56; testes, minute.

The approach to maturity in these birds, as shown by our large series, is as follows: First, the ear-coverts become dusky; next, the under mandible becomes black with only a narrow line of yellowish along the cutting edge. At this period the buffy white of the mid-breast has changed to pure white, and a buffy white patch about one and one-half the length of the culmen appears under the chin. The dusky area about the ear-coverts has increased in size so they extend from a line with the pupil of the eye to half-way down the neck. Fleckings of dusky appear in the rufous on each side of under neck. The tips of the greater and middle wing-coverts show white in the centre surrounded with the bright rufous. Buffy white appears on the lores, the coloring on the head becomes less ochraceous. Thus the changes go on until we have the well known adult plumage, with the pure white tail-coverts; white tips to the wing-coverts; black on throat, preceded by the restricted white area about as long as the culmen. The pattern of this white patch varies in each individual, but in fully mature specimens a narrow band of white extends entirely around the forehead at the base of the upper mandible, widening out over the lores—which are entirely white, but with black bases to the feathers—and joins broadly with the white of the throat. At the base of the lower mandible is a small patch of black; on the lower neck the white gradually disappears as tips to the feathers of the neck and fore breast; the mantle is brownish with rufous cast and has indistinct white tips to the feathers of the lower part. Our series shows no difference between the male and female. Confined to Oahu island. Length, 5.50; wing spread, 7.75; wing, 2.51; tail, 2.18; tarsus, .83; culmen, .54; mid-toe and claw, .56.

### **Vestiaria coccinea,** Forster. Iiwi.

This beautiful bird, once so common on the island, is now very scarce. During the entire four months I have been collecting only two have been secured. Another has recently been presented to the Museum through the courtesy of Dr. Huddy of Honolulu. However, these birds are probably more abundant in the Waianae mountains, which I have not been able to explore because of the quarantine. On February 27, while collecting in the large ohia forest of Waiolani mountain, at an elevation of 1300 feet, I saw an Iiwi enter a fresh-built nest in an ohia tree (*Metrosideros polymorpha*). I secured the old bird and the nest; unfortunately, however, there were no eggs, the nest not being quite complete. The bird is a female in beautiful summer plumage. General color, a bright vermilion; wings and tail, black; inner two feathers of secondaries, white; feet, light vermilion; bill, vermilion, darker at tip; eye, hazel. The stomach contained the remains of insects and ohia stamens. Length, 6; wing, 2.87; tail, 2; tarsus, 1.12; culmen, .97. The nest was placed about 40 feet from the ground, and was well secured in the crotch of three small branches, at the end of a big limb standing straight up for 12 feet without any lower branches. The nest was completely hidden by leaves and the yellow ohia blooms; the exterior was composed of club moss and small twigs; the inside was of moss, fern pulu, and hair-like fibres from leaves; outside it was 5–7 in diameter; inside, 3.5–2; depth, 2.

### **Himatione sanguinea,** Gmel. Apapane.

While the Apapane is by no means abundant it is still not uncommon in the mountains of Oahu. They are found in the ohia forests at an elevation of 1000 feet. These birds begin to pair about the middle of February, and I frequently saw them sporting as they flew across the cañon. They may be easily decoyed by giving their call of Cheep in a soft whistle. On February 27 three of these birds alighted on an ohia tree quite near me, and one which proved to be a male spread out his wings like a strutting turkey cock and danced gracefully to the great satisfaction of the spectators. These birds when flying make a drumming noise with their wings which sounds like the tapping of a woodpecker in the distance.

On March 3, at an elevation of 1200 feet on Waiolani mountain, I heard an Apapane singing from an ohia tree. There were two, a male and female; I gave the call, a faint cheep, cheep, and the female flew into the tree under which I was standing and was taken. The male continued to sing, his notes being a sweet whistled Hop-o-lee, ch-ch-ch, lee-lee, cha-lee, cha-lee, cha-lee, liquid and beautiful, with frequent changes in the arrangement and abreviations of the above sounds. They usually, as in this case, continue moving rapidly about from one branch to another, taking good care to keep themselves well screened behind thick bunches of leaves, for they are a suspicious and wary bird. After watching this bird for some time I hardened my heart and added him to the collection in the Museum. I have found five nests of this species, but as yet no eggs. The nests are usually in the ohia trees. A fresh nest taken February 23 measures 5×5 in diameter on the outside, and 2.25×2 on the inside; depth, 1.10. This nest was found in an ohia tree about 20 feet from the ground; elevation, 1300 feet. The outside of the nest was of moss interwoven with small Ieie roots, with a foundation of small twigs; the inside was of fine hair-like dried fibres of leaves which looked almost like horse-hair. With a good microscope I carefully examined the stomach contents of ten Apapane; remains of insects and larvæ together with bits of stamens and pollen from the ohia were found in all.

The Apapane is a bright crimson in color, brighter on the head; slightly gray shading into white on lower belly, and under tail-coverts white; tails and wings, black. Our series of twenty specimens will not corroborate Mr. Wilson's statement in the "Aves Hawaiienses" that "the females differ from the males in having the general crimson of the plumage of a distinctly lighter shade, while the crimson on the outer edge of the secondaries is of the same shade as the rest of the plumage, whereas in the males it is of much lighter tint." In the birds before me all the fully adult specimens, both male and female, have the edging of the secondaries the same color as the mantle; while in the immature of both sexes the edging of the secondaries has a yellowish color; they probably do not lose this sign of immaturity until the second year, as I have taken birds that were nesting which still showed a faint trace of orange-yellowish on their secondaries. In general color the difference in the sexes is so slight as to often be unappreciable.

A young female just beginning to assume the first indication of red was taken February 27. The general color of this bird was grayish tinged with dirty ochraceous; belly and under tail-coverts, white; a slight trace of crimson appearing on head and mantle; edgings on the outer webs of the secondaries and wing-coverts, reddish buff; base of lower mandible, yellowish; a slight white marking near the end of the outer webs of the second, third and fourth primaries as in adult birds. This specimen measured as follows: Length, 5; spread of wing, 7; wing, 2.53; tail, 1.77; tarsus, .83; culmen, .61; its depth at base, .19. This bird is found on all the islands.

ORDER PASSERES. FAMILY **Drepanidæ.**

### **Chlorodrepanis chloris,** Cab. Amakihi.

Although these birds are not rare I have only secured three. They are so small and their color matches so well the green of the foliage as to make it almost impossible to distinguish them. Their faint little note, sounding like ss ss hissed in a subdued tone, seems to come from almost anywhere and is a poor guide to their location. They are found on the wooded mountain ridges and in the cañons at an elevation of about 1100 feet. An immature male (No. 1335) was taken January 30 on Waiolani mountain at an elevation of 1087 feet. This bird was busily engaged in looking for small insects among the branches of a koa tree. Its stomach contained five small larvæ and the remains of two adult flies. On February 21 I shot another (No. 1343) while feeding on small insects which I saw it picking from the leaves and branches of an ohia bush at an elevation of 1049 feet. This bird was accompanied by another which I thought to be its mate, for it soon returned to the same bush and was taken (No. 1344). These two specimens, a male and female, were in very immature plumage and their organs showed no signs of development; so instead of being mated they may have been merely members of the same brood.

All of these specimens have the well curved horn-colored bill, with light yellowish on the base of the lower mandible. The feet and tarsus are dark with a raw umber tint. All have the greater and middle wing-coverts tipped with whitish, surrounded with a faint trace of olive green; primaries and secondaries dark with greenish edge to outer webs, which merges into light gray towards the tips; secondaries with more or less white on upper part of inner web; tail, dark with greenish outer edge to all the feathers except the two outer feathers, which show a faint edging of grayish; lores, grayish; back, tinged with olive green. In No. 1335, evidently an older bird, the coloring is brighter on the sides of head above the ear-coverts; there is also a bright yellow superciliary stripe; under parts, buffy white streaked with yellowish on throat and breast; lower abdomen and under tail-coverts, white. Following are the measurements of the three specimens: No. 1335. ♂ Length, 4.5; spread of wing, 7.75; wing, 2.56; culmen, .62; its depth at nostril, .19; tarsus, .75; mid-toe and claw, .68. No. 1343. ♂ Length, 4.5; spread of wing, 6.5; wing, 2.50; tail, 1.50; culmen, .56; its depth at nostril, .19; mid-toe and claw, .63. No. 1344. ♀ Length, 4.75; spread of wing, 6.5; wing, 2.43; tail, 1.50; culmen, .56; its depth at nostril, .19; mid-toe and claw, .75. Confined to Oahu island.

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[Those marked with an asterisk were obtained by exchange.]

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# LIST OF ACCESSIONS.

## DEPARTMENT OF ETHNOLOGY.

6800 Bowl cut from compact basalt; from J. C. Searle. Hawaiian.

6820 Poi pounder of peculiar form (cast); Peabody Museum exchange. Hawaiian.

6733 Paddle. Samoan Ids.

6734 Baskets made of pandanus leaf (2). Samoan Ids.

6736 Coconut cup for paint or taik; from Rev. C. M. Hyde. Gilbert Ids.

6737 String of dog teeth; from Rev. C. M. Hyde. Gilbert Ids.

6738 Stone adze. Hawaiian.

6739 Ostrich egg laid at Christchurch, New Zealand.

6743 Longiel or curved club. Solomon Ids.

6744 Carved boomerang. Queensland.

6745 Portion of ear ring inlaid with tortoise-shell. Solomon Ids.

6746 Seed rattles for dances (2). Solomon Ids.

6748 Stone axe. Australia.

6749 Kauri gum, a series of five specimens polished. New Zealand.

6755 Seal cut from kauri gum. New Zealand.

6756 Kauri gum with insects inclosed (2). New Zealand.

6758 Turbo shells etched by prisoners (2). New Caledonia.

6760 Pearl shells polished (3). Queensland.

6763 Partitions of shell of Nautilus pompilius, ornament. Torres Strait.

6766 Bracelets of Nassa arcularis (2). Solomon Ids.

6769 String of shell money. Solomon Ids.

6770 Necklace of shells. Solomon Ids.

6771 Leguminous beans (2). Queensland.

6772 Quondongs (5). Australia.

6773 Seeds (14). Australia.

6774 Shell armlet. Gilbert Ids.

6775 Tortoise-shell armlet. New Guinea.

6776 Boar tusk. Solomon Ids.

6777 Armlets braided from Gleichenia fibre. Solomon Ids.

6778 Finger ring of tortoise-shell. Samoan Ids.

6779 Forehead ornament, disk of shell. Solomon Ids.

6780 Fish hooks (4). Solomon Ids.

6785 Armlet of carved shell. New Guinea.

6786 Rings of Conus shell (2). New Guinea.

6795 Fisherman's idol in rough lava, Molokai. Hawaiian.

6796 Stone dish for offerings to an idol. Hawaiian.

6797 Stone kapa presser. Hawaiian.

6798 Grass hula dress (2). Hawaiian.

7530 Poi pounder of common form. Hawaiian.

8129 Tree carved and hollowed for a drum (Fig. 1). Malekula, New Hebrides.

8130 Similar sacred drum, but smaller. Malekula, New Hebrides.

8131 Idol carved from the lower stem of a tree fern (Fig. 2). Malekula, New Hebrides.

8132 Similar idol, both painted red and white (Fig. 2). Malekula, New Hebrides.

8133 Image composed of sticks and human crania (Fig. 3). Malekula, New Hebrides.

8134 Image composed of sticks and human crania (Fig. 3). Malekula, New Hebrides.

8135 Image similar to last but with cotton head piece. Malekula, New Hebrides.

8136 Phallic image of sticks and gum. Malekula, New Hebrides.

8137 Masks of light wood painted red (3). Malekula, New Hebrides.

8140 Fine woven mat dress of a woman. Malekula, New Hebrides.

8143 Mat dresses for women (2). Malekula, New Hebrides.

8186 Wooden awa bowl with twelve legs. Given by Lieut. W. E. Safford. Samoa.

8187 Awa cup of coconut beautifully tinted. Given by Lieut. W. E. Safford. Samoa.

8188 Carved wood upete for siapo. Given by Lieut. W. E. Safford. Samoa.

8189 Portion of shell for scraping siapo. Given by Lieut. W. E. Safford. Samoa.

8190 Pandanus baskets (4). Given by Lieut. W. E. Safford. Samoa.

8193 Fan of open structure. Given by Lieut. W. E. Safford. Samoa.

8571 Poi umeke of large size, partly hollowed out. Given by H. G. K. Lyman. Hawaiian.

8572 Pandanus leaf prepared for mat making. Hawaiian.

8573 Pandanus leaf prepared for mat making, finer kind. Hawaiian.

8574 Pandanus mat partly made, to show procedure. Hawaiian.

8579 Cloak made from the feathers of Apteryx mantelli. New Zealand.

8580 Stone dish of large size found in an heiau (Fig. 5). Hawaiian.

8581 *Patu of schist 13½ inches long. Chatham Ids.

8582 Patu similar to last, 12¼ in. long. Chatham Ids.

8583 Patu similar to last, 12½ in. long. Chatham Ids.

8584 Patu similar to last, 12 in. long. Chatham Ids.

8585 Adz head of fine basalt, 8½ in. long. Chatham Ids.

8586 Adz head of fine basalt, 13½ in. long. Chatham Ids.

8587 Nine basalt adz heads from 2¾ in. to 8¼ in. long. Chatham Ids.

8597 Flint adz head unfinished. Chatham Ids.

8598 Flint adz heads (2). Chatham Ids.

8600 Adz, complete. Chatham Ids.

8601 Flint chisels (2), 4 in. and 2½ in. long. Chatham Ids.

8603 Basalt chisel, 4¼ in long. Chatham Ids.

8604 Basalt chisel, 11 in. long. Chatham Ids.

8605 Adz head of basalt, 7 in. long. Chatham Ids.

8606 Sandstone grindstones (2). Chatham Ids.

8608 Blubber knives of slate (2). Chatham Ids.

8610 Blubber knives of stone (2). Chatham Ids.

8613 Blubber knives of chert (2). Chatham Ids.

8615 Mere or double-edged club of schist, 14 in. long. Chatham Ids.

8616 Mere of similar material, 10¼ in. long. Chatham Ids.

8617 Musical instrument of the bone of an albatross. Chatham Ids.

8618 Bone eel-threaders (2). Chatham Ids.

8620 Heitiki or amulet of bone. Chatham Ids.

8621 Breast and ear ornaments of cachelot teeth (2). Chatham Ids.

8623 Bone heads of bird spears (2). Chatham Ids.

8625 Bone needles, straight and curved (2). Chatham Ids.

8627 Fish hooks of bone, carved (7). Chatham Ids.

8792 Shell axe mounted, Tridacna shell (Fig. 8). Gilbert Ids.

8793 Shell adze mounted, Tridacna shell (Fig. 8). Gilbert Ids.

8794 Rasps made of sunfish skin bound to wood handles (4, Fig. 9). Gilbert Ids.

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*This collection of Moriori implements will be explained at greater length with illustrations in the Memoirs of this Museum. It is of great value and interest.

8798 Scraper of tortoise shell with a wood handle. Micronesia.
8799 Combs carved from wood (2). Gilbert Ids.
8801 Head and neck ornament. Ruk, Caroline Ids.
8802 Wooden spear with blunt barbs. Ruk, Caroline Ids.
8803 Necklace of red Chama shell disks, very choice. Ruk, Caroline Ids.
8804 Necklaces of Engina shells (2). Marshall Ids.
8806 Necklace of Neritina shells. Marshall Ids.
8807 Necklace of Cardium shells. Marshall Ids.
8808 Necklaces of Melampus shells (3). Marshall Ids.
8812 Hawaiian kapa, 3 specimens. Hawaii.

## MOUNTED SKELETONS.

6801 Arctocephalus lobatus, Gray. Australia.
6802 Halicore australis, Cuvier. (Dugong.) Australia.
6803 Macropus giganteus, Zimmermann. Australia.
6804 Ornithorhynchus anatinus, Shaw. Australia.
6805 Dacelo gigas, Bodd. New South Wales.
6806 Menura superba, Davis. (Lyre Bird.) New South Wales.
6807 Nestor notabilis, Gould. (Kea.) New Zealand.
6808 Dromæus novæ-hollandiæ, Latham. (Emu.) Australia.
6809 Eudyptila minor, Gray. (Penguin.) New South Wales.
6810 Hydrosaurus varius, Gray. (Lace-lizard.) New South Wales.
6811 Cistudo clausa, Owen. Indiana, U. S. A.
8200 Diomedia brachyura, Temminck. Northern Pacific.
6719 Apteryx mantelli, Bartl. New Zealand.
8141 Male. New Hebrides.
8634 Ear drums of Physeter macrocephalus (2). Chatham Ids.

## MOUNTED SKINS.

8199 Trichecus obesus, Illiger. (Pacific Walrus.) Alaska.
8201 Petaurus breviceps papuanus, Thomas. New Britain.
8202 Myrmecobius fasciatus, Waterhouse. Western Australia.
8203 Pteropus melanopogon, Schleg. New Britain.

8204 Pteropus poliocephalus, Temminck. New South Wales.
8205 Pteropus griseus, E. Geof. Duke of York Id.
8206 Pteropus capistriatus, Peters. New Britain.
8207 Harpyia major, Dobs. Duke of York Id.
8208 Callorhinus ursinus (Fur Seal), Gray. ♂ Pribilov Ids.
8209 Callorhinus ursinus (Fur Seal), Gray. ♀ Pribilov Ids.

## BIRD SKINS.

(Those marked * have been mounted by Mr. Bryan.)

8705 Aluda arvensis. ♂ * Oahu. Coll. A. Seale.
8706 Aluda arvensis. ♀ * Oahu. Coll. A. Seale.
8707 Acridotheres tristis (Mina). ♂ Oahu. Coll. A. Seale.
8708 Fulica alae (Albino). ♂ Maui. Given by G. P. Wilder.
8709 Gallinula sandwicensis. ♂ * Oahu. Coll. A. Seale.
8710 Calidris arenaria. ♂ * Oahu. Coll. A. Seale.
8711 Charadrius fulvus. ♂ * Oahu. Coll. A. Seale.
8712 Charadrius fulvus. ♂ Oahu. Coll. A. Seale.
8713 Charadrius fulvus. ♂ Oahu. Coll. A. Seale.
8714 Charadrius fulvus. ♂ Oahu. Coll. A. Seale.
8715 Chasiempis gayi. ♂ * Oahu. Coll. A. Seale.
8716 Chasiempis gayi. ♂ * Oahu. Coll. A. Seale.
8717 Charadrius fulvus. ♂ Oahu. Coll. A. Seale.
8718 Charadrius fulvus. ♂ Oahu. Coll. A. Seale.
8719 Charadrius fulvus. ♂ Oahu. Coll. A. Seale.
8720 Charadrius fulvus. ♂ Oahu. Coll. A. Seale.
8721 Asio accipitrinus. ♂ Oahu. Coll. A. Seale.
8722 Charadrius fulvus. ♂ (Fall plum.) Hawaii. Given by H. W. Henshaw.
8723 Larus occidentalis. ♀ Oahu. Coll. A. Seale.
8724 Larus occidentalis. ♂ Oahu. Coll. A. Seale.
8725 Sterna maxima. ♂ Oahu. Coll. A. Seale.
8726 Arenaria interpres. ♂ Oahu. Coll. A. Seale.
8727 Arenaria interpres. ♂ Oahu. Coll. A. Seale.
8728 Turtur chinensis. Oahu. Coll. A. Seale.
8729 Telespiza cantans. ♀ Laysan Id. By Exchange.
8730 Telespiza cantans. ♀ Laysan Id. By Exchange.
8731 Telespiza cantans. ♀ Laysan Id. By Exchange.
8732 Telespiza cantans. ♀ Laysan Id. By Exchange.

8733 Acrocephalus familiaris. ♂ Laysan Id. By Exchange.
8734 Acrocephalus familiaris. ♀ Laysan Id. By Exchange.
8735 Acrocephalus familiaris. ♀ Laysan Id. By Exchange.
8736 Himatione freethi. ♀ Laysan Id. By Exchange.
8737 Himatione freethi. ♂ Laysan Id. By Exchange.
8738 Porzanula palmeri. ♂ Laysan Id. By Exchange.
8739 Porzanula palmeri. ♀ Laysan Id. By Exchange.
8740 Porzanula palmeri. ♂ Laysan Id. By Exchange.
8741 Porzanula palmeri. ♀ Laysan Id. By Exchange.
8742 Diomedia nigripes. ♀ Midway Id. By Exchange.
8743 Diomedia immutabilis. Laysan Id. By Exchange.
8744 Anas laysanensis. ♀ Laysan Id. By Exchange.
8745 Anas laysanensis. ♂ Laysan Id. By Exchange.
8746 Diomedia immutabilis. ♂ Laysan Id. By Exchange.
8747 Sula cyanops. ♀ Laysan Id. By Exchange.
8748 Sula cyanops. ♂ Laysan Id. By Exchange.
8749 Sula piscator. ♂ French Frigates Id. By Exchange.
8750 Sula piscator. ♂ Laysan Id. By Exchange.
8751 Sula sula. ♀ Midway Id. By Exchange.
8752 Sula sula. ♂ Lisianski Id. By Exchange.
8753 Phaëthon rubricauda. ♂ Laysan Id. By Exchange.
8754 Phaëthon rubricauda. ♂ Kermadec Ids. By Exchange.
8755 Phaëthon rubricauda. ♂ Kermadec Ids. By Exchange.
8756 Fregata aquila. Laysan Id. By Exchange.
8757 Fregata aquila. Laysan Id. By Exchange.
8758 Haliplana fuliginosa. ♀ French Frigates Id. By Exchange.
8759 Haliplana fuliginosa. ♀ French Frigates Id. By Exchange.
8760 Gygis alba kittlitzi. Laysan Id. By Exchange.
8761 Sterna lunata. Laysan Id. By Exchange.
8762 Œstrelata hypoleuca. ♂ Laysan Id. By Exchange.
8763 Œstrelata hypoleuca. ♂ Laysan Id. By Exchange.
8764 Œstrelata hypoleuca. ♂ Laysan Id. By Exchange.
8765 Puffinus cuneatus. ♀ Laysan Id. By Exchange.
8766 Puffinus cuneatus. ♀ Laysan Id. By Exchange.
8767 Bulweria bulweri. ♂ French Frigates Id. By Exchange.
8768 Bulweria bulweri. ♂ French Frigates Id. By Exchange.
8769 Puffinus nativitatis. ♀ French Frigates Id. By Exchange.
8770 Puffinus nativitatis. ♂ French Frigates Id. By Exchange.
8771 Anous stolidus. ♀ French Frigates Id. By Exchange.
8772 Micranous hawaiiensis. ♀ Laysan Id. By Exchange.

8773 Charadrius fulvus. ♀ Laysan Id. By Exchange.
8774 Charadrius fulvus. ♀ Laysan Id. By exchange.
8775 Strepsilas interpres. ♀ Laysan Id. By Exchange.
8776 Strepsilas interpres. ♀ Laysan Id. By Exchange.
8777 Totanus incanus. ♀ Laysan Id. By Exchange.
8778 Numenius tahitiensis. ♀ Laysan Id. By Exchange.
9008 Gygis alba kittlitzi. ♂ Laysan Id. By Exchange.
9009 Chrysoenas luteovirens. ♂ Fiji. By Purchase.
9010 Chrysoenas luteovirens. ♂ * Fiji. By Purchase.
9011 Chrysoenas luteovirens. ♀ Fiji. By Purchase.
9012 Chrysoenas luteovirens. ♀ Fiji. By Purchase.
9013 Chrysoenas luteovirens. ♀ Fiji. By Purchase.
9014 Chrysoenas luteovirens. ♀ Fiji. By Purchase.
9015 Chrysoenas luteovirens. ♀ * Fiji. By Purchase.
9016 Chalcophaps chrysochlora. ♂ * Queensland. By Purchase.
9017 Chalcophaps chrysochlora. ♂ Queensland. By Purchase.
9018 Macropygia phasianella. ♂ By Purchase.
9019 Macropygia phasianella. ♀ * By Purchase.
9020 Macropygia phasianella ♂ * By Purchase.
9021 Megaloprepia magnifica. ♀ * By Purchase.
9022 Megaloprepia magnifica. ♂ By Purchase.
9023 Megaloprepia magnifica. ♀ By Purchase.
9024 Megaloprepia magnifica. ♀ By Purchase.
9025 Ptilopus perousei.* Fiji. By Purchase.
9026 Ptilopus perousei. Fiji. By Purchase.
9027 Ptilopus ponapensis. Fiji. By Purchase.
9028 Ptilopus ponapensis.* Fiji. By Purchase.
9029 Ptilopus rarotongensis.* Fiji. By Purchase.
9030 Psitteuteles chlorolepidotus.* Queensland. By Purchase.
9031 Psitteuteles chlorolepidotus.* Queensland. By Purchase.
9032 Cacatua galerita.* Queensland. By Purchase.
9033 Trichoglossus novæ-hollandiæ.* Queensland. By Purchase.
9034 Trichoglossus novæ-hollandiæ (7). Queensland. By Purchase.
9041 Aprosmictus cyanopygius (4).** Queensland. By Purchase.
9045 Glossopsittacus porphyrocephalus. Queensland. By Purchase.
9046 Seven unidentified species.* By Purchase.
9053 Ægintha temporalis (4).** Queensland. By Purchase.
9057 Two unidentified species. Queensland. By Purchase.

9059 Erythrura pealii.* Queensland. By Purchase.

9060 Dicæum hirundinaceum (2).** Queensland. By Purchase.

9062 Machærorhynchus flaviventer. ♀ * Queensland. By Purchase.

9063 Machærorhynchus flaviventer (8). ♂ * Queensland. By Purchase.

9071 Machærorhynchus flaviventer (5). ♀ Queensland. By Purchase.

9076 Four unidentified specimens.** By Purchase.

9081 Malurus elegans. ♂ * Queensland. By Purchase.

9082 Malurus elegans (2). ♀ Queensland. By Purchase.

9084 Malurus melanocephalus (6). ♂ * New South Wales. By Purchase.

9090 Malurus melanocephalus. ♀ * New South Wales. By Purchase.

9091 Four unidentified specimens.** By Purchase.

9095 Ptilotis polygramma.* Queensland. By Purchase.

9096 Ptilotis limbata (3).** Queensland. By Purchase.

9999 Dacelo gigas. ♂ Queensland. By Purchase.

9100 Dacelo gigas. ♀ Queensland. By Purchase.

9101 Alcyone azurea. ♀ * Queensland. By Purchase.

9102 Tanysiptera sylvia.* Queensland. By Purchase.

9103 Halcyon macleayi (6).* Queensland. By Purchase.

9109 Two unidentified specimens.* By Purchase.

9111 Chalcococcyx plagosus. ♂ * Queensland. By Purchase.

9112 Chalcococcyx plagosus. ♀ * Queensland. By Purchase.

9113 Rhipidura rufifrons.* Queensland. By Purchase.

9114 Rhipidura tricolor.* Queensland. By Purchase.

9115 Malurus sp.* Queensland. By Purchase.

9116 Two unidentified specimens.* By Purchase.

9118 Ptilorhis paradisea (9). ♂ * Queensland. By Purchase.

9127 Ptilorhis paradisea (2). ♀ * Queensland. By Purchase.

9129 Ptilotis auricomis. New South Wales. By Purchase.

9130 Caprimulgus macrurus. ♂ Queensland. By Purchase.

9131 Cracticus quoyi (3).* Queensland. By Purchase.

9134 Merops ornatus.* Queensland. By Purchase.

9135 Myzomela obscura.* Queensland. By Purchase.

9136 Myzomela sanguinolenta. ♂ * By Purchase.

9137 Myzomela jugularis. ♂ * By Purchase.

9138 Myiagra azureicapilla. ♂ * By Purchase.

9139 Cinnyris zeylanica. ♂ * Ceylon. By Purchase.
9140 Cinnyris comorensis. ♂ * Ceylon. By Purchase.
9141 Ælurœdis viridis (2). ♀ * Queensland. By Purchase.
9143 Six unidentified specimens.*** By Purchase.
9149 Haliplana fuliginosa (6). ♂ Oahu. Coll. A. Seale.
9155 Haliplana fuliginosa. ♀ Oahu. Coll. A. Seale.
9156 Anous stolidus (3). ♂ Oahu. Coll. A. Seale.
9159 Totanus incanus. ♀ Oahu. Coll. A. Seale.
9160 Phasianus colchicus ♀ * Oahu. Coll. A. Seale.
9161 Charadrius fulvus. ♀ * Oahu. Coll. A. Seale.
9162 Totanus incanus. ♂ * Oahu. Coll. A. Seale.
9163 Totanus incanus. ♀ * Oahu. Coll. A. Seale.
9164 Anous hawaiiensis (2). ♂ Oahu. Coll. A. Seale.
9166 Dafila acuta. ♂ Oahu. Coll. A. Seale.
9167 Dafila acuta. ♀ Oahu. Coll. A. Seale.
9168 Anas wyvillianus. ♂ Oahu. Coll. A. Seale.
9169 Porphyrio melanotus. ♂ Oahu. Coll. A. Seale.
9170 Nycticorax nycticorax. ♂ Oahu. Coll. A. Seale.
9171 Arenaria interpres. ♀ Oahu. Coll. A. Seale.
9172 Charadrius fulvus (2). ♂ Oahu. Coll. A. Seale.
6740 Emu eggs (2). Queensland. Purchased.

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## MOLLUSCA.

(The numbers are not given as they will be altered somewhat for the Catalogue of the entire collection of Mollusca, now in preparation.)

Octopus punctatus, Gabb. Cast en papier maché. North Pacific.
  cuvieri, D'Orb. Torres Strait.
Argonauta argo, Linn. ♂ 3 stages in alcohol. Mediterranean.
Sepiola rondeleti, D'Orb.; in alcohol. Mediterranean.
Nautilus pompilius, Linn., bisected; in alcohol. Torres Strait.
Pneumodermon mediterraneum, Ben.; in alcohol. Mediterranean.
Clionopsis krohnii; in alcohol. Mediterranean.
Murex blainvillei, Payr. Naples.
  carboneri, Jouss.
  cornutus, Linn. W. Africa.
  foliatus, Martyn. Japan.
  malabaricus, Mel. Persian Gulf.

Murex mitræformis, Sowerby. Natal.
scolopax, Dillwyn. Persian Gulf.
senegalensis (var. calcar), Gmel. Japan.
Muricidea hexagonus, Lamarck. Penang.
Phyllonotus endivia, Lam. Philippines.
Chicoreus saxatilis, Linn. Indo-Pacific.
Urosalpynx contracta, Reeve. Aden.
Trophon flindersi, A. & A. Victoria, Australia.
Purpura situla, Reeve. Aden.
cingulata, Linn. Cape Town.
lapilloides, Conrad. California.
Sistrum adelaidensis, Crosse. Victoria, Australia.
meyendorffi, Cab. Durban, Natal.
Triton concinnus, Reeve. Hawaiian Ids.
eburneus, Crosse. Victoria, Australia.
maculosus, Gmel. Mauritius.
nodiferus, Lam. Indo-Pacific.
sinensis, Rve. China.
verrucosus, Rve. Australia.
Ranella concinna, Dunker. Kurachi.
Fusus australis, Quoy. Australia.
distans, Lam. Pacific.
proboscidiferus, Lam. N. Australia.
Peristernia maculata, Rve. Australia.
nassatula, Lam. Mauritius.
Siphonalia dilatata, Quoy. New Zealand.
maxima, Tryon. Tasmania.
Fulgur perversa, Linn. Florida.
perversa, egg cases. Florida.
Cominella maculata, Martyn. Poverty Bay, New Zealand.
Latrunculus mollianus, Chem. Kurachi.
valentinianus, Swainson. Red Sea.
Bullia kurachiensis, Angus. Kurachi.
persica, Smith. Kurachi.
vittata, Linn. Ceylon.
diluta, Krauss. Natal.
Nassa nodifera, Paris. Aden.
obookensis, Jouss. Aden.
persica, Martyn. Aden.
pullus, Linn. Aden.

Turbinella rapa, Lam. Ceylon.
  scolymus, Lam. West Indies.
Lyria deliciosa, Mont. New Caledonia.
Turricula costellaris, Lam. Singapore.
Oliva araneosa, Lam. Panama.
  araneosa (var. polpastra), Duclos. Straits of Magellan.
Columbella dalli, E. A. Smith. Vancouver.
Bela brachystomoides, Cpr. California.
  trevelyana, Turton. Norway.
Conus acuminatus, Hwass. Red Sea.
  anemone, Lam. Australia.
  araneosus, Hwass. Philippines.
  archiepiscopus, Hwass. East Indies.
  betulinus, Linn. Singapore.
  characteristicus, Gmel.
  genuanus, Hwass. West Africa.
  interruptus, Brod. Panama.
  janus, Hwass. Cochin China.
  lithoglyphus, Mensch. East Indies.
  maldivus, Hwass. Mauritius.
  mercator, Linn. West Indies.
  rattus, Hwass. Indo-Pacific.
  stercus-muscarum, Linn. Pelew Ids.
  vautieri, Kiener. Marquesas Ids.
Strombus accipitrinus, Lam. West Indies.
  gigas, Linn. Bahamas.
  melanostoma, Swainson. Philippines.
  peruvianus, Swainson. Panama.
Dolium maculatum, Lam. Singapore.
Maleo ringens, Swainson. Pacific.
Struthiolaria papulosa, Martyn. Australia.
Cassis coronulata, Lam. Philippines.
Cypræa childreni, Gray. Borneo.
  cribellum, Gaskoin. Mauritius.
  cumingi, Gray. Paumotu Arch.
  cylindrica, Born. Australia.
  indica, Gmelin. S. Pacific.
  picta, Gray. Cape de Verde Ids.
  piperita, Solander. Australia.
  polita, Roberts. Japan.

Cypræa pustulata, Lam. Panama.
stercoraria, Linn. Africa.
Trivia sphærula, Mighels. Paumotu Arch.
Natica cancrena, Linn. West Indies.
Vivipara glauca, Linn.
Nerita atropurpura, Recl. Singapore.
Phasianella bulimoides, Lam. Australia.
Astralium sulcatum, Martyn. New Zealand.
Turbo marmoratus, Linn. China.
Haliotis pulcherrima, Martyn.
Fissurella crassa, Lam. Valparaiso.
Acmæa mitra, Esch. California.
pelta, Esch. California.
Cryptochiton stelleri, Midd. California.
Haminea rotundata, A. Adams. Australia.
virescens, Sowerby. Pitcairn Id.
Hydatina physis, Linn. Mauritius.
Dollabella scapula, Martyn. Port Dennison.
Rhytida lampra, Pfr. Tasmania.
Zonites algira, Linn. Spain.
Flammulina fordei, Brazier. Tasmania.
Alexia meridionalis, Brazier. Tasmania.
Gundlachia beddomei, Pett. Tasmania.
Gastrochæna mumia, Spengler. Singapore.
Pisidium tasmanicum, Ten-Woods. Tasmania.
Unio æsopus, Green. Mississippi River.
camptodon, Say. New Orleans.
clavus, Lam. Ohio River.
coccineus, Lea. Ohio River.
foliatus, Hild. Ohio River.
fragosus, Conrad. Ohio River.
gracilis, Barnes. Ohio River.
graniferus, (var.) Lea. Cumberland River.
iris, Lea. Ohio River.
jejunus, Lea. Virginia.
lachrymosus, Lea. Miami Canal.
obliquus, Lam. Ohio.
phaseolus, Hild. Ohio.
plicatus, Lesueur. Ohio River.
rugosa, Barnes. Ohio River.

Unio schoolcraftia, Lea. Michigan.
shepardianus, Lea. Georgia.
spatulata, Lea. Ohio.
subovatus, Barnes. Ohio.
trigonus, Lea. Ohio River.
ventricosus, Barnes. Illinois.
verrucosus, Barnes. Miami River.
zigzag, Lea. Ohio River.
Margaritana calceola, Lea. Genesee River.
deltoidea, Lea. Ohio River.
Anodonta edentula, Say. New York.
Leda minuta, Fabr. Norway.
Yoldia lenticula, Möller. Spitzbergen.
Arca modiola, Linn. Mediterranean.
navicularis, Brod. China.
tetragona, Poli. Mediterranean.
Glycymeris striatularis, Lam. Australia.
Pecten asperimus, Lam. Tasmania.
aspersus, Lam. Mediterranean.
clavatus. Mediterranean.
corallinoides, Poli. Mediterranean.
crassicostatus, Sowerby. Moluccas.
danicus, Chemnitz. Scotland.
gibbus, Linn. Senegal.
layardi, Rve. Ceylon.
lemniscatus, Rve. Mauritius.
magellanicus, Lam. Massachusetts.
senatorius, Gmel. Zanzibar.
serratus, Sby. Mauritius.
splendidus, Sby. Torres Strait.
squamosus, Gmel. Moluccas.
subnodosus, Sby. Galapagos Ids.
tranquebaricus, Gmel. Tranquebar.
ventricosus, Sby. Lower California.
zelandiæ, Gray. New Zealand.
Vola dentata, Sby. California.
fumata, Rve. Australia.
Amussium balloti, Bernhardi. New Caledonia.
japonicum, Gmel. Japan.
Ostrea borealis, Lam. Massachusetts.

# RADIATA.

8150 Ophiocoma æthiops, Lutken; in alcohol. Panama.
8151 Ophionereis annulata, Lyman; in alcohol. Samoan Ids.
8152 Ophiomastrix annulosa, M. & T. Pelew Ids.
8153 Astropecten bispinosus, M. & T. Australia.
8154 Archaster agassizii, Verr.; in alcohol. Martha's Vineyard.
8155 Asterias ochracea, Brand. California.
8156 Heliaster kubingii, Xanthus. Chili.
8157 Acanthaster sp. Samoan Ids.
8158 Stichaster aurantiacus, M. Chili.
8159 Culcita grex.; in formaldehyde.
8160 Anthenea granulifera, Gray. Australia.
8161 Oreaster turritus, M. & T. Pelew Ids.
8162 Nidorella armata, Gray. Panama.
8163 Linckia lævigata, Lam. Australia.
8164 Asterina australis, M. & T. Australia.
8165 Asterina calcar, Lam. Tasmania.
8166 Dorocidaris papillata, Ag. Bay of Naples.
8167 Goniocidaris tubaria, Lutk. S. Australia.
8168 Phyllacanthus annulifera, Ag. Australia.
8169 Stephanocidaris bispinosa, Ag. Philippines.
8170 Diadema mexicanum, A. Ag. Mexico.
8171 Arbacia spatuligera; A. Ag. Peru.
8172 Salmacis alexandri, Bell. Australia.
8173 Amblypneustes ovum, Lam. Australia.
8174 Strongylocentrotus erythrogrammus, Ag. Australia.
8175 Strongylocentrotus tuberculatus, Lam. Lord Howe Id.
8176 Euechinus chloroticus, Verr. New Zealand.
6792 Echinus miliaris, Australia.
6793 Echinus sp. Australia.
8177 Hipponoe depressa, Ag. Lower California.
8178 Clypeaster speciosus. California.
8179 Laganum bonani, Kl. Tasmania.
8180 Echmarachnius parma, Lam. Maine.
8181 Arachnoides placenta, Ag. Port Mackay.
8182 Echinocardium australe, Norman; in alcohol. Shetland.
8183 Metalia pectoralis, Ag. Bahamas.
8184 Lovenia cordiformis, Lutk. California.

# LIST OF RECENT CORALS.

[In the Museum before the year 1899.]

It has seemed best to give a complete list of the corals in the Museum, and from time to time, in these Annual Reports, it is hoped that more or less complete lists of the contents of the collections may be given.

| | | |
|---|---|---|
| 8825 | Euphyllia fimbriata, E. & H. | Micronesia. |
| 8826 | plicata, E. & H. | Micronesia. |
| 8827 | turgida, Dana. | Torres Straits. |
| 8828 | sp. | Samoa. |
| 8829 | Mussa multilobata, Dana. | Micronesia. |
| 8830 | sinensis, E. & H. | Torres Straits. |
| 8831 | tenuidentata, E. & H. | Torres Straits. |
| 8832 | Trachyphyllia amarantum, E. & H. | Micronesia. |
| 8833 | Tridacophyllia laciniata. | |
| 8834 | lactuca, Dana. | Micronesia. |
| 8835 | Dichocœnia sp. | Bahamas. |
| 8836 | ? | Torres Straits. |
| 8837 | ? | Torres Straits. |
| 8838 | Aphrastræa deformis, E. & H. | Torres Straits. |
| 8839 | Cyphastræa chalcidium, Forskal. | do. |
| 8840 | Goniastræa eximia, E. & H. | do. |
| 8841 | Prionastræa robusta, do. | do. |
| 8842 | sp. | Torres Straits. |
| 8843 | sp. | do. |
| 8844 | sp. | do. |
| 8845 | sp. | do. |
| 8846 | Rhodaræa gracilis, E. & H. | Torres Straits. |
| 8847 | Cœloria arabica, Klz. | Torres Straits. |
| 8848 | Diploria cerebriformis, E. & H. | Bahamas. |
| 8930 | cerebriformis, do. | do. |
| 2705 | Leptoria tenuis, do. | |
| 8849 | Merulina ampliata, Lam. | Micronesia. |
| 8850 | ampliata, Lam. | Torres Straits. |
| 8851 | regalis, Dana. | Fiji. |
| 8852 | regalis, Dana. | Fiji. |

8853 Fungia diversidens, E. & H. Fiji.
8854 patella, do. do.
8855 patella, do. do.
8856 patella, do. do.
8857 patella, do. do. [var.]
8858 repanda, Dana. Fiji.
8859 repanda, Dana. Fiji.
8860 Pleuractis scutaria, Verrill. Fiji.
8861 scutaria, Verrill. Fiji.
8862 scutaria, Verrill. Fiji.
8863 Dendrogyra cylindrica, Ehr. Bahamas.
8864 cylindrica, Ehr. Bahamas.
8865 Ctenactis sp. Fiji.
8866 sp. Fiji.
8867 sp. Fiji.
7630 sp. Gilbert Ids.
7631 sp. Gilbert Ids.
8868 Herpetolitha limax, Esch. Torres Straits.
2711 crassa, Dana. Fiji.
2712 crassa, Dana. Fiji.
8869 Cryptabacia talpina, E. & H. Torres Straits.
8870 Halomitra clypeus, Verrill. Samoa.
8871 clypeus, Verrill. Samoa.
2713 clypeus, Verrill. Micronesia.
8872 Lithactinia pileiformis, E. & H. Fiji.
8873 Pavonia divaricata, Dana. Samoa.
8874 divaricata, Dana. Samoa.
8875 decussata, Dana. Samoa. (2 specimens.)
8876 decussata, Dana. Samoa.
2727 decussata, Dana. Micronesia.
8877 sp. Micronesia.
8878 Podabacia crustacea, E. & H. Micronesia.
8879 Hydnophora demidoffi, Fischer. Torres Straits.
8880 rigida, Dana. Micronesia.
8881 Pachyseris fluctuosa, Verrill. Micronesia.
2733 Dendrophyllia nigrescens, Dana. Fiji.
2734 nigrescens, Dana. Gilbert Ids.
8882 Galaxea bougainvillei, Blain. Torres Straits.
8883 Turbinaria frondens, Verrill. Torres Straits.
8884 peltata, E. & H. Torres Straits.

8885 Turbinaria peltata, E. & H.
8886 Astræopora echinata, Verrill. Torres Straits.
8887 Madrepora abrotanoides, Lam. Fiji.
8888 abrotanoides, Lam.
8889 abrotanoides, Lam.
8890 alliomorpha, Brook. Fiji.
8891 alliomorpha, Brook. Fiji.
8892 calamaria, Brook. Fiji.
8893 cervicornis, Lam. Micronesia.
8894 concinna, Brook. Fiji.
8895 concinna, Brook. Fiji.
8896 conferta, Quelch. Fiji.
8897 conferta, Quelch. Fiji.
8898 cymbicyathus, Brook. Fiji.
8899 cymbicyathus, Brook. Fiji.
2703 cytherea, Dana. Tahiti.
8900 dilatata, Brook. Fiji.
2716 echinata, Dana. Samoa.
8901 gravida, Dana. Fiji.
8902 leptocyathus, Brook. Samoa.
8903 millipora, Ehr. Fiji.
8904 nobilis, Dana. Micronesia.
8905 pacifica, Brook. Fiji.
8906 pacifica, Brook. Fiji.
8907 palifera, Lam. Torres Straits.
8908 palifera, Lam. Torres Straits.
8909 pulchra (var. stricta), Brook. Fiji. (3 specimens.
8910 pulchra (var. stricta), Brook.
2714 reticulata, Brook.
2700 rosaria, Dana. Fiji.
2701 rosaria, Dana. Fiji.
8911 rosaria (var. dumosa), Dana. Fiji.
8912 studeri, Brook.
2702 spicifera, Dana. Fiji.
2715 specifera, Dana. Samoa. (2 specimens.)
2717 samoënsis.
8913 valenciennesi, E. & H. Fiji.
8914 sp. Torres Straits.
2724 sp.
2726 sp.

8915 Montipora scabricula, Dana. Torres Straits.
8916 Alveopora excelsa, Verrill.
8917 Seriatopora hystrix, Dana. Fiji.
8918 hystrix, Dana. Fiji.
8919 hystrix, Dana. Fiji.
8920 Stylophora danæ, E. & H. Micronesia.
8921 Pocillopora acuta, Lam. Micronesia.
2708 aspera (var. lata) Verrill. Oahu, H. I.
2706 cespitosa, Dana. Hawaii.
2707 cespitosa, Dana. Oahu.
8922 danæ, Verrill. Fiji.
2709 ligulata, Oahu.
8923 nobilis, Verrill. Samoa.
2710 nobilis, Verrill. Oahu.
8924 Heliopora cœrulea, Dana. Torres Straits.
8925 cœrulea do. do.
8926 Porites arenosa, E. & H. do.
8927 lutea, do. do.
8148 Stylaster sp. Samoa. (?)
2735 Disticopora coccinea. Gilbert Ids.
8928 Millepora platyphylla, Dana. Tahiti.
8929 platyphylla, Dana. Samoa.
2729 platyphylla, Dana. Samoa.
2732 ramosa, Dana.
2718 tortuosa, Dana. Samoa.
2737 Allopora sanguinea. Micronesia.
2704 Tubipora syringa, Dana. Fiji.
2719 syringa, Dana. Fiji.
8147 Rhipidogorgia flabellum, Val. Bahamas.
8149 Mellitea ochracea, Lam. Tonga.

## PALÆOZOIC CORALS.

8211 Acervularia davidsoni, E. & H. Hamilton. Iowa City.
8212 davidsoni, E. & H. Hamilton. Iowa City.
8213 davidsoni, E. & H. Devonian. Near Dubuque, Iowa.
8214 Acrophyllum oneidaense, Billings. Corniferous. Falls of the Ohio.
8215 rugosum, G. K. Greene. Corniferous. Falls of the Ohio.

8216 Alveolites constans, Davis. Corniferous. Falls of the Ohio.
8217 fibrosus, Davis. Niagara. Louisville, Ky.
8218 goldfussi, Billings. Hamilton. Cuylersville, N. Y.
8219 goldfussi, Billings. Hamilton. Charlestown, Ind.
8220 minimus, Davis. Corniferous. Falls of the Ohio.
8221 mordax, Davis. Middle Devonian. Falls of the Ohio.
8222 niagarensis, Nicholson. Niagara. Bear Grass Creek, Ky.
8223 scandularis, Davis. Hamilton. Charlestown, Ind.
8224 squamosus, Billings. Corniferous. Falls of the Ohio.
8225 undosus, S. A. Miller. Niagara. Louisville, Ky.
8226 Amplexus coralloides, Sowerby. Warsaw. Lanesville, Ind.
8227 shumardi, E. & H. Niagara. Louisville, Ky.
8228 Aulacophyllum convergens, Hall. Hamilton. Charlestown, Ind.
8229 sulcatum, d'Orbigny. Corniferous. Falls of the Ohio.
8230 Aulopora conferta, Winchell. Hamilton. Near Charlestown, Ind.
8231 erecta, Rominger. Hamilton. Charlestown, Ind.
8232 serpens, Goldfuss. Hamilton. Charlestown, Ind.
8233 Blothrophyllum bucculentum, G. K. Greene. Hamilton. Near Charlestown, Ind.
8234 cingulatum, G. K. Greene. Corniferous. Falls of the Ohio.
8235 conigerum, G. K. Greene. Hamilton. Charlestown, Ind.
8236 decorticatum, Billings. Corniferous. Falls of the Ohio.
8237 flexuosum, G. K. Greene. Hamilton. Near Charlestown, Ind.
8238 promissum, Hall. Corniferous. Falls of the Ohio.
8239 sinuosum, Hall. Corniferous. Falls of the Ohio.
8240 zaphrentiforme, Davis. Hamilton. Charlestown, Ind.
8261 Calapœcia crebriformis, Nicholson. Hudson River. Jefferson Co., Ind.
8262 Calceola tenneseensis, Roemer. Niagara. Wayne Co., Tenn.
8241 Campophyllum torquium, Owen. Carboniferous. Bird Creek, Ind.
8263 Cannapora junciformis, Hall. Niagara. Rochester, N. Y.
8242 Chonophyllum magnificum, Billings. Corniferous. Falls of the Ohio.
8243 nanum, Davis. Hamilton. Charlestown, Ind.
8244 Chonostegites clappi, E. & H. Corniferous. Le Roy, N. Y.

8245 Cladopora alcicornis, Davis. Hamilton. Charlestown, Ind.
8246 aspera, Rominger. Corniferous. Falls of the Ohio.
8247 cryptodens, Rominger. Corniferous. Falls of the Ohio.
8248 expatiata, Rominger. Corniferous. Falls of the Ohio.
8249 fisheri, Billings. Corniferous. Falls of the Ohio.
8250 gurleyi, G. K. Greene. Corniferous. Falls of the Ohio.
8251 intermedia, G. K. Greene. Corniferous. Falls of the Ohio.
8252 labiosa, Billings. Corniferous. Falls of the Ohio.
8253 laqueata, Rominger. Niagara. Louisville, Ky.
8254 pinguis, Rominger. Corniferous. Le Roy, N. Y.
8255 reticulata, Hall. Niagara. Illinois.
8256 rimosa, Rominger. Corniferous. Falls of the Ohio.
8257 robusta, Rominger. Corniferous. Falls of the Ohio.
8258 roemeri, Rominger. Corniferous. Falls of the Ohio.
8259 turgida, Rominger. Corniferous. Falls of the Ohio.
8260 winchellana, S. A. Miller. Corniferous. Falls of the Ohio.
8269 Clisiophyllum conigerum, Rominger. Corniferous. Falls of the Ohio.
8266 Cœlophyllum pyriforme, Hall. Corniferous. Falls of the Ohio.
8264 Cœnites laminata, Hall. Niagara. Louisville, Ky.
8265 verticillata, Winchell. Niagara. Louisville, Ky.
8267 Columnaria alveolata, Goldfuss. Hudson River. Madison, Ind.
8268 Constellaria antheloidea, Hall. Hudson River. Cincinnati, O.
8532 antheloidea, do. do. do.
8270 Cyathaxonia profunda, E. & H.
8271 wisconsinensis, Whitfield. Niagara. Chicago, Ill.
8272 compressa, G. K. Greene. Warsaw. Lanesville, Ind.
8273 Cyathophyllum arctifossa, Hall. Corniferous. Falls of the Ohio.
8274 brevicorne, Davis. Corniferous. Falls of the Ohio.
8275 galerum, Hall. Hamilton. Western New York.
8276 geniculatum, Rominger. Hamilton. Charlestown, Ind.
8277 houghtoni, do. do. Western New York.
8278 juvenis, Rominger. Corniferous. Charlestown, Ind.
8279 radicula, Rominger. Niagara. Louisville, Ky.
8280 robustum, Hall. Hamilton. Western New York.
8281 rugosum, Hall. Corniferous. Charlestown, Ind.
8282 rugosum, Hall. Corniferous. Jefferson Co., Ind.

8283 Cyathophyllum tomatum, Davis. Hamilton. Charlestown, Ind.
8284 validum, Hall. Corniferous. Falls of the Ohio.
8285 zenkeri, Billings. Hamilton. Charlestown, Ind.
8286 Cystiphyllum americanum, E. & H. Hamilton. Clark Co., Ind.
8287 americanum, E. & H. Hamilton. Western New York.
8288 americanum, do. do. do.
8289 americanum, do. do. do.
8290 conifollis, Hall. do. Charlestown, Ind.
8291 crateriformis, Hall. Corniferous. Falls of the Ohio.
8292 crassatum, G. K. Greene. Hamilton. Charlestown, Ind.
8293 decurrens, G. K. Greene. Corniferous. Falls of the Ohio.
8294 gemmatum, G. K. Greene. Hamilton. Near Charlestown, Ind.
8295 grande, Billings. Hamilton. Near Charlestown, Ind.
8296 granilineatum, Hall. Niagara. Louisville, Ky.
8297 lacineatum, G. K. Greene. Hamilton. Near Charlestown, Ind.
8298 latiradius, Hall. Hamilton. Charlestown, Ind.
8299 nanum, Hall. Corniferous. Falls of the Ohio.
8300 niagarensis, Hall. Niagara. Louisville, Ky.
8301 osculum, G. K. Greene. Hamilton. Charlestown, Ind.
8302 ossiculum, do. do. do.
8303 plicatum, Davis. Corniferous. Falls of the Ohio.
8304 pustulatum, Hall. Corniferous. Falls of the Ohio.
8305 senecaënse, Billings. Hamilton. Clark Co., Ind.
8306 squamosum, Nicholson. Corniferous. Falls of the Ohio.
8307 varians, Hall. Hamilton. Moscow, N. Y.
8308 vesiculosum, Goldfuss. Hamilton. Charlestown, Ind.
8533 Cytelasma lanesvillense, S. A. Miller. St. Louis. Lanesville, Ind.
8328 Dendropora ornata, Rominger. Hamilton. Charlestown, Ind.
8309 Diphyphyllum adnatum, Hall. Corniferous. Charlestown, Ind.
8310 apertum, Hall. Corniferous. Falls of the Ohio.
8311 archiaci, Billings. Corniferous. Falls of the Ohio.
8312 cæspitosum, Hall. Niagara. Bridgeport, Ill.
8313 coagulatum, Davis. Corniferous. Falls of the Ohio.
8314 colletti, G. K. Greene. Corniferous. Falls of the Ohio.

8315 Diphyphyllum cylindraceum, Hall. Corniferous. Charlestown, Ind.
8316 gigas, Rominger. Corniferous. Michigan(?).
8317 laxum, G. K. Greene. Hamilton. Near Charlestown, Ind.
8319 multicaule, Hall. Niagara. Monticello, Jones Co., Iowa.
8320 panicum, Winchell. Corniferous. Jefferson Co., Ind.
8321 prolatum, G. K. Greene. Hamilton. Near Charlestown, Ind.
8322 rugosum, E. & H. Niagara. Workhouse Quarry, Louisville, Ky.
8323 simcoense, Billings. Corniferous. Le Roy, N. Y.
8324 stramineum, Billings. Corniferous. Le Roy, N. Y.
8325 unicum, G. K. Greene. Hamilton. Charlestown, Ind.
8326 verneuilianus, E. & H. Corniferous. Clark Co., Ind.
8327 wadsworthi, G. K. Greene. Hamilton. Charlestown, Ind.
8329 Duncanella borealis, Nicholson. Niagara. Waldron, Ind.
8330 Favistella stellata, Hall. Hudson River. Indiana.
8534 stellata, do. do. Jefferson Co., Ind.
8331 Favosites amplissimus, Davis. Cornifrous. Falls of the Ohio.
8332 argus, Hall. Hamilton. Pavilion, N. Y.
8333 arbuscula, Hall. Hamilton. Pavilion, N. Y.
8334 canadensis, Billings. Corniferous. Le Roy, N. Y.
8335 cariosus, Davis. Corniferous. Falls of the Ohio.
8336 clausus, Rominger. Hamilton. Charlestown, Ind.
8535 clausus, do. do. do.
8337*a* clelandi, Davis. Corniferous. Falls of the Ohio.
8338 constrictus, Hall. Niagara. Rochester, N. Y.
8339 convexus, Davis. Corniferous. Falls of the Ohio.
8340 cymosus, Davis. Corniferous. Falls of the Ohio.
8341*a* digitatus, Rominger. Corniferous. Le Roy, N. Y.
8342 dumosus, Winchell. Corniferous. Falls of the Ohio.
8343 emmonsi, Rominger. Hamilton. Iowa City.
8536 emmonsi, Rominger. Corniferous. Falls of the Ohio.
8344 emmonsi, Rominger. Corniferous. Clark Co., Ind.
8345 epidermatus, Rominger. Corniferous. Charlestown, Ind.
8537 epidermatus, Rominger. Corniferous. Lime Rock, N. Y.
8346 epidermatus (var. corticosa), Hall. Corniferous. Le Roy, N. Y.
8347 eximius, Davis. Hamilton. Crab Orchard, Ky.
8348 explanatus, Hall. Hamilton. Western New York.

8349 Favosites explanatus, Hall. Hamilton. E. Bethany, N. Y.
8350 favosus, Goldfuss. Niagara. Indiana.
8351 forbesi (var. occidentalis), Hall. Niagara. Warren Co., Ohio.
8352 fustiformis, Davis. Corniferous. Falls of the Ohio.
8253 globosus, G. K. Greene. Hamilton. Charlestown, Ind.
8254 hamiltoniæ, Hall. Hamilton. Charlestown, Ind.
8355 hemisphericus, Y. & S. Corniferous. Louisville, Ky.
8356 hemisphericus (var. distorta), Y. & S. Corniferous. Ind.
8357 hemisphericus (var. recta, Hall), Y. & S. Corniferous. Indiana(?).
8358 hemisphericus (var. turbinatus, Billings), Y. & S. Corniferous. Charlestown, Ind.
8359 hispidus, Rominger. Niagara. Hawthorne, Ill.
8360 limitaris, Rominger. Corniferous. Falls of the Ohio.
8361 maximus, Troost. Corniferous. Falls of the Ohio.
8362 mundus (var. placentoides), Davis. Devonian. Falls of the Ohio.
8363 niagarensis, Hall. Niagara. Indiana(?).
8364 nitellus, Winchell. Hamilton. Charlestown, Ind.
8365 occidens, Winchell. Niagara. Hawthorne, Ill.
8366 pirum, Davis. Corniferous. Falls of the Ohio.
8367 placenta, Rominger. Corniferus. York, Livingston Co., N. Y.
8368 radiatus, Rominger. Hamilton. Charlestown, Ind.
8369 radiciformis, Rominger. Corniferous. Charlestown, Ind.
8370 spiculatus, Davis. Corniferous. Falls of the Ohio.
8371 spinigerus, Hall. Niagara. Waldron, Ind.
8372 tuberosus, Rominger. Corniferous. Indiana(?).
8373 troosti, E. & H. Corniferous. Falls of the Ohio.
8374 venustus, Hall. Niagara. Wayne Co., Tenn.
8375 venustus, do. do. Rochester, N. Y.
8376 winchelli, Rominger. Devonian. Michigan.
8377 winchelli, Rominger. Corniferous. Indiana.
8378 Fistulipora acervulosa, Rominger. Hamilton. Watson, Ind.
8379 minuta, do. do. do.
8380 unilinea, Hall. Hamilton. York, N. Y.
8381 sp. Cisco. Graham, Texas.
8382 Hadrophyllum d'orbignyi, E. & H. Upper Devonian. Charlestown, Ind.

8383 Halysites catenulatus, Linnæus. Niagara. Indiana(?).
8384 Heliolites interstinctus, Linnæus. Niagara. Louisville, Ky.
8385 interstinctus, Linnæus. Niagara. Louisville, Ky.
8386 macrostylus, Hall. Niagara. Illinois.
8387 megastoma, McCoy. Niagara. Louisville, Ky.
8388 pyriformis, Guettard. Niagara. Louisville, Ky.
8389 subtubulatus, McCoy. Niagara. Louisville, Ky.
8390 Heliophyllum acuminatum, Hall. Corniferous. Charlestown, Ind.
8391 annulatum, Hall. Corniferous. Charlestown, Ind.
8538 annulatum, do. do. do.
8392 arachne, Hall. Hamilton. Western New York.
8393 beecheri, G. K. Greene. Hamilton. Near Charlestown, Ind.
8394 bordeni, G. K. Greene. Corniferous. Charlestown, Ind.
8395 canadense, Billings. Corniferous.
8396 confluens, Hall. Hamilton. Western New York.
8397 corniculum, Lesueur. Corniferous. Falls of the Ohio.
8398 degener, Hall. Hamilton. Charlestown, Ind.
8399 denticulatum, Hall. Corniferous. Falls of the Ohio.
8400 eriense, Billings. Corniferous. Falls of the Ohio.
8401 exiguum, Billings. Corniferous. Louisville, Ky.
8402 fecundum, Hall. Corniferous. Falls of the Ohio.
8403 gemmatum, do. do. do.
8404 geniculatum, Rominger. Hamilton. Charlestown.
8405 gurleyi, G. K. Greene. do. Near Charlestown, Ind.
8406 halli, E. & H. do. Genesee Co., N. Y.
8407 halli, do. do. Clark Co., N. Y.
8408 halli, do. do. Moscow, N. Y.
8409 halli, do. (var. reflexum, Hall). Hamilton. East Bethany, N. Y.
8410 invaginatum, Hall. Corniferous. Falls of the Ohio.
8411 irregulare, Hall. Hamilton. Western New York.
8412 jacksoni, G. K. Greene. Hamilton. Charlestown, Ind.
8413 juvensis, Rominger. Hamilton. Charlestown, Ind.
8414 laticrescens, Hall. Corniferous. Charlestown, Ind.
8415 multigemmatum, Davis. Corniferous. Falls of the Ohio.
8416 nanum, G. K. Greene. Hamilton. Charlestown, Ind.
8417 nettlerothi, Hall. Corniferous. Falls of the Ohio.

8418 Heliophyllum obconicum, Hall. Hamilton. W. New York.
8419 obesum, G. K. Greene. Hamilton. Charlestown, Ind.
8420 osculatum, G. K. Greene. Hamilton. Charlestown, Ind.
8421 pocillatum, Hall. Corniferous. Falls of the Ohio.
8422 proliferum, Hall. Hamilton. Western New York.
8423 scyphulus, do. do. Charlestown, Ind.
8424 scyphus, Rominger. do. do.
8425 tenuimurale, Hall. Coniferous. Falls of the Ohio.
8426 tumidulum, G. K. Greene. Hamilton. Charlestown, Ind.
8427 turgidum, do. do. do.
8428 Houghtonia huronica, Rominger. Hudson River. Marion Co., Ky.
8429 Lithostrotion canadense, Castlenau. Carboniferous. St. Louis.
8430 proliferum, Hall. Subcarboniferous. Colesburg, Ky.
8431 Lophophyllum proliferum, McChesney. Carboniferous. Graham, Texas.
8432 Michelinia clappi, E. & H. Corniferous. Falls of the Ohio.
8433 convexa, d'Orbigny. Corniferous. Indiana(?).
8434 dividua, Hall. Hamilton. East Bethany, N. Y.
8435 dividua, Hall. Upper Devonian. Crab Orchard, Ky.
8436 favositoidea, Billings. Corniferous. Falls of the Ohio.
8539 favositoidea, Billings. Corniferous. Ontario, Canada.
8437 insignis, Rominger. Hamilton. Charlestown, Ind.
8438 insignis, do. do. Sellersburg, Ind.
8439 insignis, do. do. Falls of the Ohio.
8440 maxima, Troost. Corniferous.
8441 maxima, Troost. Corniferous. Louisville, Ky.
8442 stylopora, Eaton. Hamilton. Pavilion, N. Y.
8443 Monticulipora dalii, E. & H. Hudson River. Richmond, Ind.
8444 delicatula, Nicholson. do. Warren Co., O.
8445 frondosa, d'Orbigny. Trenton. Decorah, Iowa.
8446 lycoperdon, Say. Trenton.
8447 mammulata, d'Orbigny. Hudson River. Cincinnati, O.
8448 mammulata, d'Orbigny. do Madison, Ind.
8449 meeki, James. Hudson River. Warren Co., O.
8450 ramosa, d'Orbigny. do. Jefferson Co., Ind.
8451 rugosa, Hall. Trenton. Tyrone, Ky.
8452 ulrichi, Nicholson. Hudson River. Covington, Ky.
8453 varians, James. Hudson River. Lebanon, O.

8454 Omphyma stokesi, E. & H. Niagara. Louisville, Ky.
8455 stokesi, E. & H. Niagara. Bridgeport, Ill.
8456 verrucosa, Rafinesque. Niagara. Louisville, Ky.
8457 verrucosa, Rafinesque. Niagara. Louisville, Ky.
8458 Pachyphyllum woodmani, White. Chemung. Iowa.
8459 Pachypora fischeri, Billings. Corniferous. Falls of the Ohio.
8460 Phillipsastræa gigas, Owen. Upper Devonian. Crab Orchard, Ky.
8461 verneuili, E. & H. Corniferous. Ontario, Canada.
8462 Plasmopora elegans, Hall. Niagara. Louisville, Ky.
8463 follis, E. & H. Niagara. Louisville, Ky.
8464 follis, do. do Hillsboro, O.
8465 Ptychophyllum expansum, E. & H. Corniferous. Falls of the Ohio.
8466 ipomœa, Davis. Niagara. Louisville, Ky.
8467 knappi, Hall. Hamilton. Crab Orchard, Ky.
8468 versiforme, Hall. Corniferous. Falls of the Ohio.
8469 Romingeria cornuta, Billings. Hamilton. Charlestown, Ind.
8470 dispensa, Davis. Corniferous. Falls of the Ohio.
8471 fasciculata, Davis. Hamilton. Charlestown, Ind.
8472 Streptelasma corniculum, Hall. Hudson R. Richmond, Ind.
8473 rectum, Hall. Hamilton. Western New York.
8474 Striatopora alba, Davis. Corniferous. Falls of the Ohio.
8475 cavernosa, Rominger. Corniferous. Le Roy, N. Y.
8476 limbata, Eaton. Hamilton. York, N. Y.
8477 Strombodes pentagonus, Goldfuss. Niagara. Louisville, Ky.
8478 separatus, Ulrich. Niagara. Louisville, Ky.
8479 striatus, d'Orbigny. Niagara. Louisville, Ky.
8480 unicus, Davis. Niagara. Louisville, Ky.
8481 Syringopora annulata, Rominger. Niagara. Michigan(?).
8482 hisingeri, Billings. Corniferous. Le Roy, N. Y.
8483 maclurii, Billings. Corniferous. Falls of the Ohio.
8484 multattenuata, McChesney. St. Louis. Harrison Co., Ind.
8485 nobilis, Billings. Corniferous. Falls of the Ohio.
8486 perelegans, Billings. Corniferous. Le Roy, N. Y.
8487 tabulata, Billings. Corniferous. Falls of the Ohio.
8337*b* tubiporoides, Y. & S. Corniferous. Falls of the Ohio.
8488 Thecia major, Rominger. Niagara. Louisville, Ky.
8489 minor, Rominger. Niagara. Louisville, Ky.

8490 Thecia ramosa, Rominger. Corniferous. Falls of the Ohio.
8491 swinderniana, Goldfuss. Niagara. Louisville, Ky.
8492 Thecostegites hemisphericus, Roemer. Niagara. Wayne Co., Tenn.
8493 Trachypora elegantula, Billings. Hamilton. Clark Co., Ind.
8494 Zaphrentis acuticornis, G. K. Greene. Hamilton. Charlestown, Ind.
8495 ampliatus, G. K. Greene. Hamilton. Charlestown, Ind.
8496 calcariformis, Hall. St. Louis. Lanesville, Ind.
8497 campanulatus, G. K. Greene.
8498 centralis, E. & H. Kaskaskia. Hardin Co., Ky.
8499 chesterensis, Worthen. do. do.
8500 comis, G. K. Greene. Hamilton. Charlestown, Ind.
8501 concava, Hall. Corniferous. Charlestown, Ind.
8502 cornalba, Davis. Hamilton. Charlestown, Ind.
8341*b* cornicula, E. & H. Corniferous. Le Roy, N. Y.
8503 dalei, do. Keokuk. Edwardsville, Ind.
8504 davisana, S. A. Miller. Corniferous. Falls of the Ohio.
8505 deformis, Hall. Hamilton. Charlestown, Ind.
8506 duplicata, do. Corniferous. Falls of the Ohio.
8507 elegans, do. do. do.
8508 frequentata, do. do. do.
8509 gallicalar, Davis, Hamilton. Charlestown, Ind.
8510 gigantea, Lesueur. Corniferous. Falls of the Ohio.
8511 humilis, G. K. Greene. Hamilton. Charlestown, Ind.
8512 insolens, do. do. do.
8513 ischypus, do. do. do.
8514 lanceolata, Worthen. St. Louis. Lanesville, Ind.
8515 limatus, G. K. Greene. Hamilton. Charlestown, Ind.
8516 nitida, Hall. Corniferous. Falls of the Ohio.
8517 obliquatus, G. K. Greene. Corniferous. Falls of the Ohio.
8518 ovalis, Hall. Corniferous. Falls of the Ohio.
8519 profunda, Hall. Corniferous. Falls of the Ohio.
8520 prolifica, Billings. Corniferous. Falls of the Ohio.
8521 racienensis, Whitfield. Niagara. Bridgeport, Ill.
8522 roemeri, E. & H. Lower Helderburg. "The Tyke", Catskill.
8523 simplex, Hall. Hamilton. Western New York.
8524 spinulosa, E. & H. Kaskaskia. Hardin Co., Ky.
8525 spissa, Hall. Corniferous. Falls of the Ohio.

8526 terebrata, Hall. Corniferous. Falls of the Ohio.
8527 torta, Hall. Corniferous. Falls of the Ohio.
8528 undata, Hall. Corniferous. Le Roy, N. Y.
8529 ungula, Rominger. Corniferous. Louisville, Ky.
8530 varians, G. K. Greene. Hamilton. Charlestown.
8531 yandelli, Hall. Corniferous. Falls of the Ohio.

## BOTANICAL AND GEOLOGICAL SPECIMENS.

6788 Opals, from New South Wales.
6794 Awa root, from Samoa. Given by Dr. Kramer.
8545 Nine specimens of lava, from Kilauea. Given by Mr. F. Waldron.
8554 Lava mould of tree stem. Given by Mr. F. Waldron.
8555 Volcanic bomb. Given by Mr. F. Waldron.
8556 Rope lava crust, from Kilauea. Given by Mr. F. Waldron.
8557 Lava pushes, from Kilauea.
8558 Edge of lava stream.
8559 Lava push, from Kilauea.
8560 Inner crust of lava from near sulphur cracks, Kilauea.
8561 Inner roof of cave, Kilauea.
8562 Lava, from Kilauea.
8563 Fresh aa.
8565 Lava, from Kilauea.
8570 Block of Naio (*Myoporum sandwicense*). Given by Mrs. F. Waldron.

Many specimens of plants gathered near Kilauea have not yet been mounted in the Herbarium.

# OCCASIONAL PAPERS

OF THE

# BERNICE PAUAHI BISHOP MUSEUM OF POLYNESIAN ETHNOLOGY AND NATURAL HISTORY.

VOL. I.—NO. 3.

# Director's Report for 1900.

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HONOLULU, H. I.
BISHOP MUSEUM PRESS.
1901.

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HONOLULU, H. I.
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*To the Trustees of the Bernice Pauahi Bishop Museum.*

*Sirs:—In accordance with the vote of the Trustees at the stated meeting of January 13, 1900, I submit my Report on the condition of the Museum and the work in its various departments during the year 1900.*

*WILLIAM T. BRIGHAM*

*Director of the Museum.*

*Honolulu: March 8, 1901.*

# REPORT.

THE hope expressed in the previous Report that this Museum might soon make independent collections on the islands of the Pacific has been agreeably fulfilled during the past year by the expedition of Mr. Alvin Seale to Guam of the Marianas. By the courtesy of the United States War Department passage was allowed on a transport and for several months Mr. Seale industriously collected in various departments. The result will be seen farther on in this Report. With this exception the additions to the collections in the Museum have not been large, as until the Hawaiian Hall is ready for occupancy there is no room available for storage.

The room formerly devoted to the principal Hawaiian collection has been entirely remodeled. The cases removed and the floor replaced by concrete and mosaic tiling have left the hall ready for new cases, which are sadly needed, and have provided an effectual safeguard against the inroads of the termites. The fine Hawaiian Hall which has been long in construction is now completed and seems admirably adapted to its purpose, but as no cases have yet been provided it stands empty and unused. In the meantime the Hawaiian collections have for the most part been stored, some are on exhibition in the Hawaiian Vestibule in temporary cases, but all are suffering for want of proper cases. In a tropical climate a tight and insect-proof case is one of the most important desiderata of a Museum, and it is useless to accumulate specimens without first providing proper cases for their preservation if not for their exhibition.

While no especial attempt, except in the Guam expedition, has been made to increase the collections, much work has been done in revising the catalogues, especially the card catalogue which is locally arranged and of which each card contains as much information about the specimen that it represents as is available. In addition many of the cards bear a photograph or in some cases a drawing of the specimen, so that in consulting this catalogue one can see at a glance the nature of the specimen. As almost everything of importance has been photographed this plan has been easily carried out, and in any case it is very easy to make a group photograph of which the print can be cut to furnish the small pictures needed for the cards. By using the platinotype or bromide processes the print is as durable as the card. In some cases, as for example with poi pounders of which there are dozens much alike, the photograph shows a differentiation that no concise description could. Wherever the Museum publications furnish illustrations of objects in the collections these can be imprinted on the card as well. The card catalogue is thus in a way to become a fully illustrated record of the contents of the Museum. A new system of recording accessions has also been adopted, which it is thought will simplify the work. Hitherto the shells and plants have had a separate series of numbers in order to keep the label numbers as small as possible, the species of shells alone approaching 10,000, and now the birds and fishes have also been separated and the one in charge of each of these departments has an independent accession book for which he is responsible. Mr. Stokes has done much work on the manuscript of the catalogue of the collection of shells, which it is hoped may soon be ready for printing.

Mr. Walcott and myself made a hurried visit to Kauai, at the request of the Trustees to examine some private collections of Hawaiian antiquities, which had been offered to the Museum, but while the specimens were often desirable, there were very many duplicates and the prices asked were too high for duplicates. We found in the valley of Hanalei where sugar was largely cultivated, rice had taken its place, but elsewhere the canefields seemed to have taken all available land on that part of Kauai, even the grand grove of kukui trees near Kilauea, a grove of such antiquity that tradition does not recognize the youth of the picturesque old trees, is in danger of destruction that a few acres may be added to the canefields.

Having occasion during my vacation to visit the cities of the Atlantic seaboard I thought it desirable that Mr. Stokes should at the same time visit the American museums, and the Trustees acceded to my wishes and granted him a leave of absence and an appropriation for his expenses. His impressions of these museums I have requested him to add to this Report. I felt that his eye might notice improvements and desirable methods that might escape my examination, and we are so remote from all such institutions that it is very needful to study their work, methods and exhibits as thoroughly and as often as possible.

Soon after the publication of the first Memoir the Trustees decided that the edition of three hundred copies was not sufficient to meet the demand and ordered the issue of an additional number. This reprint has been commenced but has been delayed by the nonarrival of the colored plates made in Vienna. The printing office has been otherwise fully occupied in the preparation of the second Memoir which was issued at the close of the year. This was an Index of the Islands of the Pacific Ocean prepared by the Director, and the printing required great care and taste happily met by Mr. Greene. This and the Annual Report for 1899, which was issued about the same time, fully taxed the resources of the office. The next publication in quarto form will be Mr. Bryan's Key to the Hawaiian Birds, and this is well advanced. Much work has also been done in photographing the illustrations for the fourth Memoir which will be ready for printing during the current year. This will be a description of ancient Hawaiian Stone Implements.

By the kindness of Eric Knudsen Esq. the frame of an ancient grass house was obtained from a remote valley on the northwest coast of Kauai and Mr. W. E. H. Deverill attended to the difficult transportation of the heavy stonecut logs composing this frame. In due time this will be reerected in the new hall and properly thatched, thus preserving a genuine old Hawaiian house—*Hale pili*.

A number of books and specimens purchased in Europe during the year have not yet arrived owing to their detention in San Francisco by the Customs officials of that port. One case of books from London which was sent via Panama and San Francisco was opened at the latter port in accordance with the United States regulations and without resoldering sent on a voyage of two thousand miles. These annoyances it is hoped will now cease, for it is understood that orders making more suitable regulations have been issued.

## TABLE OF ATTENDANCE.

| 1900. | Whites. | Hawaiians. | Portuguese. | Chinese. | Japanese. | Others. | Days Open. | Closed Days. | Visitors on Closed Days. | Daily Average. | | Totals. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Open Days. | Closed Days. | |
| January ...... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| February ...... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| March ........ | 235 | 38 | 4 | 84 | 44 | 2 | 7 | .... | .... | 58 | .... | 407 |
| April .......... | 363 | 337 | 14 | 154 | 58 | 2 | 9 | 1 | 8 | 115 | 8 | 928 |
| May .......... | 488 | 204 | 40 | 226 | 95 | 3 | 8 | 5 | 66 | 124 | 13 | 1056 |
| June .......... | 434 | 115 | 59 | 132 | 79 | 5 | 10 | 10 | 72 | 75.4 | 7.2 | 824 |
| July .......... | 272 | 58 | 19 | 133 | 107 | .... | 8 | 4 | 44 | 68 | 11 | 589 |
| August ........ | 238 | 70 | 38 | 143 | 76 | 2 | 9 | 4 | 15 | 61.3 | 3.7 | 567 |
| September .... | 334 | 114 | 30 | 81 | 90 | 1 | 9 | 6 | 90 | 62.2 | 15 | 650 |
| October ...... | 335 | 127 | 8 | 95 | 37 | .... | 8 | 4 | 74 | 66 | 18.2 | 602 |
| November .... | 342 | 104 | 8 | 63 | 33 | .... | 9 | 5 | 37 | 57 | 7.4 | 550 |
| December ...... | 396 | 152 | 31 | 102 | 86 | .... | 9 | 3 | 15 | 84 | 5 | 767 |
| Totals ...... | 3437 | 1319 | 251 | 1213 | 705 | 15 | 86 | 42 | 421 | 77.1 | 9.8 | 6940 |

Owing to the prevalence of the Bubonic Plague among the Orientals of this city at the beginning of the year this Museum was closed for two months and the Assistants were fully occupied as sanitary inspectors. During the rest of the year the single road between town and the Museum has been in a most disgraceful condition, at times even dangerous, and has doubtless had an effect upon the attendance at the Museum. The attendance of whites has slightly diminished, that of Japanese increased from the previous year. Schools have made use of both the collections and the publications in their courses, and it has been found necessary to regulate this attendance to prevent annoyance to other visitors.

# Report of J. F. G. Stokes' Visit to the American Museums.

THE Trustees of the Bernice Pauahi Bishop Museum, deeming it desirable that I should become familiar with the arrangement of the larger American museums, decided to send me under the guidance of the Director, Mr. Brigham, on a short tour of inspection for this purpose through the United States. The time allowed did not permit of the most thorough examination, but the information gained and the many hints and suggestions taken advantage of, will no doubt be of value to our Museum in Honolulu. Attention was paid most particularly to the collections of Polynesian material, and when time did not permit the examination of specimens from places outside the Pacific region, these departments I was unfortunately compelled to pass unnoticed.

Much kind attention and great cordiality were shown by the gentlemen in the departments visited, and the willing help afforded was of the utmost value. Very many thanks are due these gentlemen for the assistance so readily given, and an opportunity is sought to show our Museum's appreciation for the kindnesses rendered.

The institutions visited were: The California Academy of Sciences in San Francisco; the Missouri Botanical Garden in St. Louis; the Smithsonian Institution, U. S. National Museum, Army Medical Museum, U. S. Botanical Gardens, National Zoological Gardens, and the U. S. Fish Commission building in Washington; in Philadelphia, the Academy of Natural Sciences, the Zoological Park, the Free Museum of Science and Art, the Philadelphia Commercial Museums and Memorial Hall at Fairmount Park; in New York, the Aquarium in Battery Park, Columbia University Library, the New York Zoological Garden and Botanical Museum at Bronx Park, the American Museum of Natural History and the Metropolitan Museum of Art; in Boston and Cambridge, the Boston Society of Natural History, Peabody Museum of Archæology and Ethnology, Museum of Comparative Zoology, the Museum of Fine Arts and the Boston Public Library. While in Rochester, N. Y., Ward's Natural History Establishment was looked through, and in Chicago the Field Columbian Museum was visited.

The California Academy of Sciences has done valuable work in increasing the knowledge of the natural history of the Pacific region, more particularly in the ornithological and conchological sections, in the latter branch having been assisted by the contributions of Messrs. Pease and Garrett in earlier days. I might mention here that the Garrett collection of shells is in the cases of the Bishop Museum. The bird collection was being well developed by the Curator, and the series of Pacific coast marine birds was very fine. The ethnological department had been much neglected through the want of individual attention, but the recent acquisition of an ethnologist from New York will no doubt result in the collection being placed in satisfactory order. Much time in future is to be given to the study of aboriginal life in California. The Polynesian collection was poor, which is very strange when the trade from San Francisco to the Pacific islands is taken into consideration.

Opportunity was taken to visit the Stanford University at Palo Alto, Cal., whence the benefit of Dr. Jordan's work in training young scientists is already widely felt. The study of fish is closely followed in this university, the laboratory of which was found to be as complete as modern improvements could make it. The University Museum has been carefully arranged and would rank mainly as a family museum, having no doubt been established to be of most interest to the Stanford students.

In St. Louis the beautiful and artistically arranged gardens of the Missouri Botanical Park were seen. This park originally belonged to a philanthropic botanist who bequeathed it to the state to be used as a public garden. That the responsibility of caring for the place was appreciated, was shown by the splendid order kept and the very complete naming of the plants. Adjoining the gardens was a large enclosure in which grew the larger American trees labelled with botanical and general names.

On arriving in Washington the Smithsonian Institution was visited. It was observed that one vast collection was preserved in the two buildings, the Smithsonian Institution containing the greater portion of the natural history collection, represented by the invertebrates, birds and fish (casts); the botanical portion was not seen. In this building was also a room given up to the stone and copper implements of the American aborigines. The National Museum was devoted to ethnology and anthropology, and the balance of the natural history collection comprising geological specimens, mammals and a great number of fish casts. The mode of mounting birds and mammals in groups is to be very highly recommended, as such a procedure calls for the keen observation which only the true naturalist can exercise. Of the fine groups of mammals in the National Museum, the most noteworthy was that of the bisons, where the imitation of nature was very good. There were other pleasing groups, musk-ox, antelope, caribou and moose. The collection of shells was a very valuable one, including as it did many specimens not duplicated in other institutions. However they were rather poorly exhibited on account of the lack of space, and only the kindness of the Curator, Dr. Dall, permitted the writer to obtain an adequate idea of the collection. The corals might well be increased in number, and no doubt the recent expedition of the Albatross (1899) will contribute to this department. The ethnological collections from the Pacific region were scant, although very valuable, being composed largely of specimens gathered by the Wilkes Expedition in 1841–3. There were two large stone images from Rapanui, which the museum was fortunate in possessing, and other objects from this island were fairly plentiful. The Australian and Papuan collections needed increasing, and satisfactory exchanges could be effected with the Australian museums. Of American aboriginal pottery and basket work there was great abundance, as also other specimens pertaining to American ethnology. The groups of aborigines performing home duties are worthy of especial notice. Series showing the evolution of the axe, hammer and other tools from their most primitive forms to the modern types, were admirably illustrated. There was one room which contained a large series of boats, showing every form from the dugout canoe to the modern steamboat and sailing vessel. The canoes and small boats were represented by originals, and models took the place of larger vessels. The geological collections were large and comprehensive, and the specimens displayed in a way which thoroughly showed the character of each.

It seemed strange after visiting the Capitol and Congressional Library in Washington and noting the undoubted architectural and artistic skill of Americans, that the magnificent collection in the Smithsonian Institution and National Museum should not be housed in a building more befitting the dignity of the United States' capital. Against the arrangement of the specimens in the National Museum nothing could be said, although in the Smithsonian Institution many specimens would be invisible without the aid of electric light, but the buildings should be of far grander and more magnificent style so as to be worthy of the capital of the great United States of America.

The U. S. Army Medical Museum contained many anatomical preparations of great value to the medical student. This museum also contained two tatooed and dried Maori heads from New Zealand, and it would seem more fitting if these specimens were placed with some museum for anthropology, where they would be highly valued.

It was rather an unfortunate time of the year (September) to visit the U. S. Fish Commission, as the breeding season had not commenced and the collections were not fully represented. The conveniences for taking care of the fish in all stages of growth were noted with much interest.

The National Zoological Gardens are situated near Chevy Chase, and the site chosen for this park showed that there had been great forethought in the selection of a place not only suitable for its purpose, but containing the great advantage of natural scenery. There was a fine herd of bison roaming in their extensive run. The aviary was large and kept in good order, and the reptile house well stocked. A neatly arranged aquarium was seen on the grounds, constructed on modern plans, and the mammal house contained a very representative collection. The confined inmates of the park were looking very healthy, with rare exceptions, and the care apparent on every side did great credit to the gentlemen in charge.

Reaching Philadelphia, a visit was first paid to the Academy of Natural Sciences, where Dr. Pilsbry had the kindness to accompany me when looking through the magnificent collection of molluscs in his charge. This collection, it is generally admitted, is the finest in the United States, although the Smithsonian Institution has many rare specimens not represented in this Academy. The convenient method of keeping the duplicate species in drawers below the exhibition cases would assist the work of the conchological student very much. In other branches of natural history also there were excellent opportunities for study, the working collections being well supplied and conveniently stored. In ethnology, the collection from the Pacific was not large, nor in fact was any pertaining to countries outside America. The Academy held a collection of very fine Hawaiian Kapa, which probably, on account of the space required, will never be exhibited in a satisfactory way. It was interesting to notice the similarity between some of the discoidal stones from Georgia and Alabama, and the ulumaika or bowling stones of the Hawaiians. The arrangement of the exhibits was good, as far as the specimens themselves were concerned, but great trouble was experienced in viewing them clearly owing to the darkness of the rooms—darkness due partly no doubt to the dull weather then prevailing, but in a greater degree to the building itself.

The Zoological Park has been placed in a spot possessing many natural advantages. It has been well arranged, and the comfort of the installation and the convenience of the visitors have been equally well attended to. The tank for the sea-lions with its hollowed rock in the middle, was an example of the careful planning of the place, and it was interesting to learn that the waterfowl on the small circular lake had been domesticated enough to begin to breed. Many rare animals and birds were seen here—among the birds the *Cereopsis novæ-hollandæ* being represented by two specimens alive. Considerable time was spent in the reptile house, where the Superintendent had been passing his spare time in casting and coloring different American snakes, and, for preserving the form, the advantage of snake casts over mounted skins is undoubted. The coloring of casts requires much patience and care in using the sombre shades.

A very brief visit was paid to the Philadelphia Museum at the Memorial Hall, Fairmount Park, containing many exhibits collected during the Centennial Exposition, 1876, but, although many beautiful things were seen, time was too limited for a close examination.

I was much pleased with the artistic arrangement of the Free Museum of Science and Art, and very interested in the theories of the Curator, Mr. Stewart Culin. The museum was rich in archæology, containing many steles and altars from Central America, and was also the depository for the collections made by the Babylonian expeditions under Dr. Hilprecht. In the ethnological section Mr. Culin's principles were rigidly adhered to, and it contained specimens which form, metaphorically, links of a chain connecting many widely separated countries.

The opportunity was taken to visit the Philadelphia Commercial Museum, an institution founded for the purpose of aiding the American merchant when extending his business to foreign countries. It had correspondents in every large city in the world and I was personally able to verify the information received from a town in Australia in which I had lived many years. In the museum, articles of ordinary use were shown in every stage of manufacture, and the young business man could, without leaving the building, learn how everything manufactured which he consumed, was made. In addition to this, the products of different countries were grouped together, so that a man could see enough to judge the opportunity of trade with any country previously unknown to him. An inclination was at one time apparent to include in this institution's publications papers concerning the study of zoology, but the management finally decided to confine itself to matters commercial. A suggestion was tendered by Mr. Brigham, that the institution enlarge its work a little and gather names of dealers in museum material, which suggestion was received favorably. The establishment of the museum is due entirely to the great energy expended by Dr. W. P. Wilson, to whom the merchants of the United States should feel very greatly indebted.

In New York, some time was spent in the New York Aquarium at Battery Park. The aquarium building as is generally known, was a fort called Castle Clinton, which has been modified sufficiently to make a very neat and suitably constructed aquarium. There were several large tanks built in the floor for large fish and seals, while the glass-faced tanks for the smaller fish were arranged in two tiers around the circular building. Originally Castle Clinton stood on an island some distance from the shore, but the land at this part of the harbor has been reclaimed and extended so as to bring the building within the beach line. In the reclaimed land wells have been sunk, and from these the salt water supply was obtained, the wells being repleted by the filtration into them of sea water. Apparatus was provided for heating and cooling the water supply, so that the temperature could be adjusted to meet the needs of tropical fish as well as those requiring cool water, at any season. The vegetable growth in some of the tanks looked healthy and some pretty views of submarine life were available by means of this addition. The aquarium was not as rich as expected in the variety of its collection; it had a good supply of the American fishes, more particularly those used for food, but a larger representation of tropical fish would add to its attractiveness and the public interest generally.

At Bronx Park, New York, the first institution examined was the New York Zoological Park. This park was in process of construction. One of the permanent buildings completed was the reptile house, in the construction of which much consideration had been given to the accommodation of the inmates and convenience of the working staff. The first compartment entered contained the cages for reptiles from the temperate zones lining the walls. This appartment led into one four times the size in which the collection of tropical reptiles was found ; two sides and an end of this room were reserved for cases, while at the other end was a large tank for the saurians. In the middle of the hall were two large tanks for turtles, the smaller containing salt water for marine turtles, and the larger divided into several compartments for terrapin and supplied by a stream of fresh water. Arrangements were made for heating the appartment with hot water. Behind the crocodile tank was a small conservatory in which the tropical plants cultivated throve luxuriantly. Outside the reptile house and convenient to it was a large basin intended as the summer residence of the Crocodilia. It was understood that the reptile house of the Zoological Society of London was taken as a model for the Bronx Park establishment, and the internal arrangement of the latter was certainly most admirable. The ranges for the hoofed animals, stretching along the western and southwestern borders of the park, had already been partitioned off with a high fencing of wire, and temporary shelters had been provided for the animals already in the collection. The American Ungulata were represented very fully. Among the Carnivora, the wolves, foxes and bears were provided with dens, the bears' den having been blasted out of the rock and built up with cement, and the others generally constructed of wood : strong iron railings with the upper ends turned inwards as usual, insured the safety of the visitors. The sea-lions had their pools, and looked as comfortable as on the rocks outside San Francisco. Several of the aviaries were completed, the finest of which was the flying cage, 150 feet long and 50 feet high ; it contained herons, storks and ibises. The house for the smaller mammals was ready and filled, while permanent structures had not yet been erected for members of the cat family. Very great credit is due to Mr. William T. Hornaday, the director, for the way in which the work has been carried on, and under his care the park bids fair to surpass anything of a like construction in the United States. The plans were on a scale which should make it the beau-ideal of a zoological park.

Remaining within the confines of Bronx Park, a short visit was paid to the New York Botanical Museum, Gardens and Conservatory. The interior of the museum had lately been completed, and some of the space for exhibition still waited to be filled. The botanical specimens were arranged for the convenience of students of botany and commercial people, in the latter connection most vegetable products used in manufactures being shown in the raw state with, near-by, the sketches and names of the plants producing them. A very nice arrangement was made for the young student—about a dozen good microscopes were placed in a room, showing portions of various plants, the slides being changed from time to time. By this arrangement, any one interested in botany; unable to afford the cost of a good microscope, could glean a practical knowledge difficult to obtain in other ways. The system of providing microscopes for the public in this way might advantageously be adopted by other institutions. In the portion laid out as the garden, a classification of the beds was made according to the families and genera of the plants, thus giving a student the text-book illustrated by Nature. The conservatories, just completed, were being prepared for the reception of the plants allotted to them. This institution has already commenced to publish botanical information, six bulletins having left the printer's hands.

The next institution to be visited was the American Museum of Natural History, in Central Park. This museum will, when completed, be the largest in the United States, and though but one-third of its plan has been carried out, it now approaches in size the National Museum in Washington, the collections however not being as valuable as in the latter institution, excepting those of vertebrate, paleontology, mammals and birds. These last three collections in the Museum of Natural History deserve particular notice, not only on account of their value scientifically, but also of the skilled and artistic methods adopted in their mountings. The expeditions which the Department of Paleontology has been enabled to send out for dinosaurs and fossil mammals, have been doing excellent work, and the number of new species thus obtained was very considerable. The needs of the working student have not been overlooked, and several skeletons have been mounted so that individual bones could be removed for study without disturbing the others. Very fine bird groups were exhibited, among others, the Duck Hawk Group being very remarkable. In mounting groups, more attention has been paid to those of North America; each group was composed of the male and female, with the nest and eggs, their home surroundings being imitated in a way which showed how near Art was to Nature. The same could be said of the mounting of the mammals; two large groups in particular, of moose and bison, were reputed to be the best in the world. The Archæological Department has been well arranged, and was very rich in collections from Central America and Mexico. Much attention has been paid to these localities, and where an important specimen has been unobtainable for the museum, it was represented by a well executed cast. In ethnology, some very fine collections from the Pacific region were viewed. A collection had lately been purchased, and an experiment was being made of carding the specimens on dark buff boards—the specimens thus mounted looked very well but required such a large space that it has yet to be ascertained if the extra expense and additional room needed will justify this method. A very neat and effective way of mounting the butterflies has been adopted: plaster tablets faced with glass enclosed the insects, and in order to show the back and underpart, two tablets were used for each species. This method, too, requires very much room, although making a pleasing exhibit for the public. The museum has spent much time in order to please the people of New York, and many special collections were exhibited to show forms of life found within a radius of fifty miles from New York City.

In Boston, the Society of Natural History was visited, and the museum had an appearance of long standing. The material seen in it must be of great value, although overcrowded. This society has issued many very valuable publications.

The Peabody Museum of American Archæology and Ethnology held in its halls among other fine collections, very good ones of ethnological material from the Pacific region, including rare specimens from the Hawaiian, Fijian and Marquesan Islands. Its collection of archæological specimens was very rich. The cases for exhibition were well planned, and each specimen could be seen with ease if the background of the cases were of a lighter color.

The Museum of Comparative Zoology was undoubtedly the most admirable institution for the study of zoology seen on the trip. The classification and arrangement approached perfection, and the amount of information placed in the cases was very great. Series were made illustrating the morphology of many different species, and in other cases types of genera and species had been selected and carded dissected. An excellent series of radiates were shown by the glass models made by the Blatscha Bros., and the alcoholic specimens were on view in another department. The museum possessed a giant spider crab from Japan (*Kæmpferia kæmpferi*), nearly as large as that in the Bishop Museum.

At Rochester, N. Y., Ward's Natural History Establishment was visited for the purpose of obtaining an insight to the most modern methods of mounting specimens. The workshops were examined, and the work appeared to be carried on in a very systematic and thorough manner. Several useful suggestions were kindly given by the Messrs. Ward.

In Chicago a little time was spent in the Field Columbian Museum, and while the collections were large, comprehensive and valuable, the arrangement of some left much to be desired. It would seem that little attention had been paid to the correct identification of the ethnological specimens, for many common things were found incorrectly labelled, and those which were labelled aright were not classified in anything like a satisfactory manner. The birds were nicely classified, and several very good groups were seen—some of the collection however was in such darkness, that the specimens were hardly visible. One section contained specimens illustrating all the modes of locomotion on land, including models or originals of the different types of railway engines—this department was very interesting. The museum was in one of the buildings remaining from the Columbian Exposition in 1893, and contained many of the exhibits from that fair—these latter constituted the greater part of the collection.

The journey has been very interesting and instructive, and many things were learned which will no doubt be of value in the future arrangement of the Museum.

# Report of a Mission to Guam.

BY ALVIN SEALE.

## PART I.—AVIFAUNA.

THE Marianas or Ladrone Islands consist of twenty-one small volcanic islands which extend on a north and south line for a space of about 400 miles. They were discovered by Magalhâes, March 6, 1521. For the most part they present a bold rocky coast line with high hills or low mountains rising in the interior. They are densely wooded, except on top of the mountains, where it is usually barren, or covered with tall grass.

My actual field work was confined to the island of Guam, which is the largest and southernmost of the group, being thirty-two miles long by twelve broad. This island is densely wooded, except in the northwest, where there is a small range of low mountains reaching to an elevation of 1800 feet. The general height of the island is from fifty to seventy-five feet, with a few small fresh water ponds and marshes, and perhaps eight or ten small streams.

In this paper I have followed as near as possible the A. O. U. code of nomenclature. The key, inserted for the convenience of fellow-workers in Polynesian ornithology, is chiefly compiled from various works of worth bearing on the subject. The measurements are all in inches, and like the color notes were taken from specimens in the flesh, *i. e.*, in all the Guam specimens. Unless a specimen is marked "*Immature*" an adult bird is to be understood. The local names given in Vol. V., Nov. Zool., all have a curious Japanese twist to them, and with one exception are all incorrectly spelled. The native names as herein given were all revised by Lieutenant-Governor Safford of Guam, who is the best living authority on the Chamorro language.

# KEY TO ORDERS.

**a**$^1$. Toes four, all fully connected by web. Order **Steganopodes.**

**a**$^2$. Toes four, hind toe not connected with front ones; bill with cutting edge fringed or dentate...........Order **Anseres.**

**a**$^3$. Toes four, all on the same level; bill short, strongly hooked, and with a cere at the base of the upper mandible.
Order **Raptores.**

**a**$^4$. Toes three, or if four the hind one not connected by web with the inner toe.

- **b**$^1$. Nostrils tube-shaped, feet webbed.....Order **Tubinares.**
- **b**$^2$. Nostrils not tubular, anterior toes webbed, tarsus shorter than the tail..................Order **Longipennes.**
- **b**$^3$. Nostrils not tubular, anterior toes not broadly united by web, the lower portion of the thighs naked, or else the bill is lengthened and grooved along each side, outer and middle toes separate.
  - **c**$^1$. Hind toe long and on the same level as the front toes, loral or orbital regions naked. Order **Herodiones.**
  - **c**$^2$. Hind toe short and on same level as front toes, or but slightly elevated; if long as lower mandible there is a frontal shield present.....Order **Paludicolæ.**
  - **c**$^3$. Hind toe short and below the level of the front toes. Order **Limicolæ.**
- **b**$^4$. Nostrils not tubular, the lower portion of the thighs feathered, or else the middle and outer toes are united for at least half their length.
  - **c**$^4$. Hind toe small and elevated, or else bill is without a soft cere, bill not hooked, short and stout. Order **Gallinæ.**
  - **c**$^5$. Hind toe well developed and on a level with the anterior toes, bill with a soft swollen cere at the base of the upper mandible..........Order **Columbæ.**
  - **c**$^6$. Bill without soft swollen cere.

**d$^1$.** Wing very long, about equal to the total length of the bird, which does not exceed 4.50, primaries ten, secondaries six.

Order **Macrochires.**

**d$^2$.** Wing shorter, equal to about one-half the total length of the bird, bill large, primaries nine.

Order **Coccyges.**

**d$^3$.** Wings not very long, toes three in front and one behind, the middle and outer toes not united for half their length, lower part of thighs feathered, the tarsus equal to or longer than the lateral toes.............Order **Passeres.**

## Order LONGIPENNES.—Long-winged Swimmers.

**a$^1$**. Bill without cere, lower mandible not longer than upper, tail feathers twelve, claws feeble or moderate. Family *Laridæ*, Gulls and Terns.

**b$^1$**. Tail even, hind toe perfectly developed but small, culmen more than two-thirds as long as tarsus. Genus *Larus*.

**b$^2$**. Tail graduated.

**c$^1$**. Outer tail feathers broad and rounded at tip.

**d$^1$**. Wing less than 9.5, general color black, wings lighter. Genus *Hydrochelidon*.

**d$^2$**. Wings more than 9.5, general color, including wings, a sooty black. Genus *Anous*.

**c$^2$**. Outer tail feathers sharp, pointed, the next to the outer pair the longest, general color pure white. Genus *Gygis*, Wagler.

### GENUS **LARUS** LINNÆUS.

### 1. **Larus vegae** (Palmen). **Pallas' Gull.**

Mantle light gray or pearl gray; no black spot on the bill of the adult. Length 26, wing 15.15–18.30, culmen 1.90–2.20, tarsus 2.15–2.20. *Hab.* Pacific Ocean, probably accidental on the Marianas, only one specimen having been taken there, which is now in the Paris Museum.

### GENUS **HYDROCHELIDON** BOIE.

### 2. **Hydrochelidon leucoptera** (Temm.). **White-winged Black Tern.**

General color black, silvery and white on wings; young and winter specimens with tail and under parts white. Length 9.3, culmen 1.1, wing 8.2, tail 3.1, tarsus .75, mid-toe and claw 1. *Hab.* (Doubtful) Parts of the Australian and American coasts.

### GENUS **ANOUS** LEACH.

**a$^1$**. Forehead alone is distinctly whitish. *Anous stolidus*, Linn.

**a$^2$**. Entire top of head whitish, the white changing gradually into ashy on the hind neck. *Anous leucocapillus*, Gould.

### 3. **Anous leucocapillus** Gould. **Black-cheeked Noddy.**

Lores jet black, cheeks dusky, upper and under parts nearly black, tarsus and toes dark brown. Length 13, culmen 2, wing 9, tail 5, tarsus .9, mid-toe and claw 1.4. *Hab.* Inter-tropical Atlantic, Australia, and Pacific islands. Probably resident on the island of Saipan, Marianas.

### 4. **Anous stolidus** (Linn.). **Fahan. Noddy.**

The Noddy, Catesby, Nat. Hist. Carolina, 1737, I., p. 88.
*Sterna stolida*, Linn., Syst. Nat., 1758, ed. XI., p. 173; Kittl. Kupfertaf, III., p. 27.
*Anous stolidus*, Gray, Gen. B., p. 100; Saunders, Cat. Brit. Mus. B., XXV., p. 136; Wiglesw. Av. Poly. Ber. abh. u. Mus. Dresden, 1890-91, p. 76; Rothschild, Av. Laysan, 1893, I., p. 41; Hartert, Nov. Zool., 1898, V., p. 68.
*Anous stolidus pileatus* (Scop.), Hartert, Nov. Zool., VI., p. 9.

The natives tell me this bird is very abundant on the island of Saipan. In Guam it is not very common; a few were seen on the cliffs near the entrance of the harbor of San Luis de Apra. The five specimens secured were shot on the northeast end of the island, where a small number were seen flying along the beach. These specimens are much darker in color than those from Laysan and Oahu, H. I. The measurements were as follows:—

| *Museum No.* | *Date.* | *Length.* | *Wing.* | *Tail.* | *Tarsus.* | *Culmen.* | *Mid-toe and c.* | *Sex.* |
|---|---|---|---|---|---|---|---|---|
| 9589 | June 14 | 11.15 | 6.50 | 2.75 | 1.06 | 1.18 | 1.62 | im. ♂ |
| 9590 | June 15 | 17.00 | 11.25 | 6.62 | .95 | 1.53 | 1.55 | ♀ |
| 9591 | June 16 | 17.05 | 10.87 | 7.00 | .90 | 1.59 | 1.64 | ♂ |
| 9592 | June 23 | 17.05 | 11.16 | 6.00 | 1.09 | 1.59 | 1.63 | ♂ |
| 9593 | June 23 | 17.00 | 11.00 | 6.45 | 1.00 | 1.63 | 1.55 | ♀ |

One specimen, No. 9589, was a young male, the color of which was not so dark as in the adults; the gray coloring is restricted to the forehead; there is a white superciliary band extending from posterior of the eye to the upper mandible. The chin has not yet acquired the brown feathers of the adult, but is still covered with a gray down. There is a dark wing bar on top of wings. *Hab.* Tropical and juxta-tropical seas.

## GENUS **GYGIS** WAGLER.

### 5. **Gygis alba kittlitzi** Hartert. **Chung. White Tern.**

*Gygis alba-kittlitzi*, Hart., Vogels. Mus. Senckenb., p. 237; *Id.* Nov. Zool., V., p. 67.
*Sterna nivea*, F. Bennett, Whaling Voy., 1840, I., p. 37.
*Gygis candida*, Wagl., Isis, 1832, p. 1223; Finsch, Ibis, 1880, pp. 330, 434; Tristr. Ibis, 1881, p. 251; Saunders, Cat. B. Brit. Mus., XXV., p. 149.
*Gygis alba*, Licht., Nomencl. Av., 1854, p. 97; Finsch, Journ. Mus. Godef., 1875, VIII., p. 43; Roth. Avif. Laysan, I., p. 35 (pl. and eggs).

Chung, the White Tern, is an abundant bird on Guam and undoubtedly nests on the island, although I did not succeed in finding the eggs. They congregate in the breadfruit trees in the midst of the jungle, and the beauty of their pure white plumage among the green leaves is very striking:—

| *Museum No.* | *Date.* | *Length.* | *Wing.* | *Tail.* | *Tarsus.* | *Culmen.* | *Mid-toe and c.* | *Sex.* |
|---|---|---|---|---|---|---|---|---|
| 9578 | June 10 | 12.75 | 9.50 | 4.68 | .56 | 1.60 | 1.15 | ♂ |
| 9580 | June 16 | 12.50 | 9.50 | 4.68 | .53 | 1.54 | 1.12 | ♂ |
| 9581 | June 16 | 12.25 | 9.50 | 4.50 | .53 | 1.50 | 1.12 | ♂ |
| 9583 | June 16 | 12.75 | 9.50 | 4.50 | .56 | 1.50 | 1.16 | ♀ |
| 9584 | July 11 | 13.00 | 9.75 | 4.80 | .50 | 1.60 | 1.15 | ♂ |
| 9579 | June 15 | 13.00 | 9.75 | 4.75 | .56 | 1.63 | 1.16 | ♂ |

The spread of the wings is about 26, and the depth of the bill at the nostrils is .31–.33. The entire plumage of the adult is ivory white with the exception of a very narrow dusky ring around the eye. The shafts of the primaries are gray; the feet and tarsus are blue with white webs, which are deeply incised; the bill is blue, darker at tip; eyes brown. In the dry skins the color of the bill becomes much darker, and the webs fade into a pale yellowish, but the toes retain their blue color and are never dark brown as given by Saunders (Brit. Mus. Cat. B., XXV., p. 150), or black as given by Rothschild (Avif. Laysan, I., p. 36). In this last citation the length of the bill is given as 0.4–0.5!—doubtless a printer's error. Two specimens of this tern, taken by H. C. Palmer on Laysan Island June, 1891, give the following measurements: Length (skins) 12.75, wing 9.75 and 9.60, tail 4.62 and 4.35, tarsus .50 and .52, mid-toe and claw 1.15 and 1.11, culmen 1.40 and 1.55, its depth at nostrils .30 and .31. *Hab.* Polynesia.

## Order TUBINARES.—Tube-nosed Swimmers.

**a**¹. Wings large, over 19, upper mandible hooked, nostrils of two distinct tubes. Family *Diomedeidæ.*

**a**². Wings smaller, less than 19, nostrils united in one tube with two barrels. Family *Procellariidæ.*

### FAMILY **DIOMEDEIDÆ.**—ALBATROSSES.

### GENUS **DIOMEDEA** LINNÆUS.

**6. Diomedea nigripes,** Aud. **Black-footed Albatross.**

General color uniformly dusky; tail coverts, base of tail, and forehead white; bill dark brown; feet black. Length 28–36, wing 18.50–20, culmen 4–4.50, tarsus 3.50–3.70, mid-toe and claw 4.05–4.40. *Hab.* Pacific Ocean generally, south to the Line; accidental in the Marianas. "One specimen in the Paris Museum."

### FAMILY **PROCELLARIIDÆ.**—PETRELS.

### GENUS **PUFFINUS** BRISSON.

**a**¹. Tarsus less than 1.65.

**b**¹. Sides of neck and breast slaty, bill .90–1. *Puffinus tenebrosus.*

**b**². Sides of neck mottled, breast and under neck white, bill 1.50. *Puffinus obscurus.*

### 7. **Puffinus tenebrosus** Pelz. **Pelzeln's Shearwater.**

Upper color sooty black, sides of neck and breast slaty with whitish margins to the feathers. Length 12, wing 7.20–7.80, tail 2.95–3.25, culmen 1–1.05, tarsus 1.40–1.45, mid-toe and claw 1.50–1.60. *Hab.* Coast of Australia.

### 8. **Puffinus obscurus** Gm. **Dusky Petrel.**

Probably same as above. Length 12, wing 7.8, tail 3.2, bill 1.5, tarsus 1.5, mid-toe and claw 1.6 (Samoan Islands). *Hab.* Tropical and sub-tropical seas.

# Order STEGANOPODES.—Totipalmated Swimmers.

**a**¹. Nostrils distinct, bill sharp-pointed without hook, chin feathered, tail short, graduated, in the adults the two middle feathers are greatly elongated. Family *Phaëthontidæ.*

**a**². Nostrils not distinct, head partly naked, bill stout but not hooked, tail about half as long as wing. Family *Sulidæ.*

**a**³. Nostrils distinct, bill hooked at tip, lores feathered, upper plumage black, tail forked, wing long. Family *Fregatidæ.*

## FAMILY **PHAETHONTIDÆ.**—TROPIC BIRDS.

### GENUS **PHAETHON** LINNÆUS.

### 9. **Phaëthon candidus** Temm. **Boatswain Bird. Tropic Bird.**

General color pure white; a black band bordering both sides of the head, passes through the eye, and terminates in a crescent-shaped mark at gap; a black band on the wings. Length 30, culmen 1.8–2, wing 10–10.6, tail 17.3–21, tarsus .8–.9. The young are barred with black. *Hab.* Inter-tropical seas, except coast of North America. "Resident on Agrigan, of the Marianas."

## FAMILY **SULIDÆ.**—GANNETS.

### GENUS **SULA** BRISSON.

**a**¹. Feet greenish or yellowish; head, breast, neck and upper parts brown. *Sula sula.*

**a**². Feet always reddish, head and neck white, tinged with buff; general color white. *Sula piscator.*

### 10. **Sula sula** Linn. **Luau. Booby. Gannet.**

*Pelecanus sula*, Linn., S. N., 1766, I., p. 218.
*Sula fusca*, Vieill., Gal. Ois., 1825, II., p. 194, pl. 277; Swinh. Ibis, 1869, p. 347 (Formosa); Tristram, Ibis, 1882, p. 144, Solomon Islands.
*Sula fiber*, Cassin (aft. L.) U. S. Ex. Exp. 1858, p. 363.
*Sula leucogastra*, Sclat. & Salv. P. Z. S., 1873, p. 651; Seebohm, B. of Jap., p. 12.
*Sula Sula*, Verr. & Des Murs. Rev. Mag. Zool., 1860, p. 442; Ridg. Man. N. A. B., p. 75; Roth. Avif. Laysan, I., p. 29; Hartert, Nov. Zool., V., p. 69; Oust. II., p. 63; Cat. B. Brit. Mus., XXVI., p. 436.

Only one specimen of the Booby was secured, although they were not at all rare. This bird was taken July 23 and proved to be an adult male. They were usually to be seen flying about the cliffs near the entrance to the harbor of San Luis de Apra. Length 30, spread of wing 4 ft. 10 in., wing 16, tail 7.75, tarsus 1.62, culmen 3.56, its depth at nostrils 1.36, mid-toe and claw 3.59. The general upper coloring, including head, neck, and fore breast is a fine uniform seal brown; hind breast, belly, under tail coverts, sides, flanks, thighs, axillaries, and under wing coverts of the secondaries, pure white; shafts of the primaries black on the upper surface, gray below; bill flesh color, with grayish tint, bluish at tip; feet and tarsus a livid light-green; iris a silvery grayish. This specimen is much darker than the summer specimens from Laysan Island. The posterior half of the primaries are especially dark brown as compared with the Laysan birds, as is also the head, neck and breast. *Hab.* Tropical and sub-tropical seas throughout the world, except the Pacific coast of America.

### 11. **Sula piscator** Linn. **Red-footed Booby.**

The general plumage of this species is white; feet always red; gular sac blackish; bare skin in front of eye red; tail white. Total length 27–30, wing 15–16, culmen 3.50. *Hab.* Inter-tropical seas, north to Florida and Lower California.

## FAMILY **FREGATIDÆ.**—MAN-OF-WAR BIRDS.

### GENUS **FREGATA** CUVIER.

a¹. Wing more than 21.5, culmen not less than 4.15. *Fregata aquila*, eill.

a². Wing less than 21, culmen less than 4.15. *Fregata ariel*, Gould.

### 12. **Fregata aquila** (Vieill.). **Frigate Bird.**

Man-of-war Bird, Edwards, Glean., 1860, II., p. 209.
*Pelecanus aquilus*, Linn., S. N., 1766, I., p. 216.
*Tachypetes aquila*, Vieill., N. Dict. d'Hist. Nat., 1817, XII., p. 146.
*Fregata aquila*, d'Orb., Sagras Hist Cuba, 1839, p. 309; Rothschild, Avif. Laysan, 1893, I., p. 21; Cat. Brit. Mus. B., XXVI., p. 443.

An adult male specimen of this bird was shot by a native November, 1899, and brought in to Lieutenant-Governor Safford, by whom it was identified. The skin was not saved, but the skeleton was presented to the Bishop Museum by Lieutenant Safford

(No. 9608). This is the first record of this species from Guam. *Hab.* Tropical and sub-tropical seas.

**13. Fregata ariel** Gould. **Australian Tropic Bird.**

General color greenish black, a white patch on each flank. Wing 19.2–21, tail 15–17, culmen 2.8–3.3. The female is a little larger, with breast and sides white, and a white collar at the rear of the neck. The young have the head and neck white; a general coloring of brown; the middle of the abdomen and the flanks white. *Hab.* Tropical Pacific and Indian Ocean.

## Order ANSERES.—Lamellirostral Swimmers.

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**a**¹. Hind toe without membranous lobe or flap. Sub-family *Anatinæ.*

**a**². Hind toe with a broad membranous flap or lobe. Sub-family *Fuligulinæ.*

### SUB-FAMILY **ANATINÆ.**—FRESH WATER DUCKS.

### GENUS **ANAS** LINNÆUS.

**14. Anas oustaleti** Salvad. **Ngang. Ladrone Duck.**

*Anas oustaleti*, Salvad., Bul. Brit. Orn. Club, XX., p. 1; *Id.*, Cat. B. Brit. Mus., XXVII., p. 189; Hartert, Nov. Zool., V., p. 66; Oust., II., p. 49.

This duck nests among the reedy swamps and streams of the island, and is not uncommon all the year round. The specimens secured were taken during the month of June. The general color of the upper surface is dark brown, the feathers margined with buff; top of head dark brown with a slight greenish tint; in some specimens the crown is slightly sprinkled with a few small buffy feathers; a pale buffy stripe extending from base of upper mandible over the eye to back of head; below this there is a dark stripe extending from the base of the upper mandible through the eye to the back of the head; sides of the head, and neck, buffy with streakings of brown; the throat buff, not streaked; under parts not so dark as the upper, the buffy tips of the feathers being longer and wider, but not so bright; wings a soft dark brown, the secondaries more or less edged with buff; speculum bluish-purple, green in some lights; it is bordered by black, followed front and back by an indistinct white or buffy line, as in *A. wyvilliana* of Hawaii; the white markings, however, are not so prominent as in the latter; bill dusky above, with small black splotches; the lower mandible lighter (No. 9534 has bill entirely black); feet and tarsus flesh color with a tint of pink; eye light hazel. Length 19.50–20, spread of wings 32, wing 10–10.50, tail 2.25–2.50, tarsus 1.63–1.85, culmen 1.75–1.80, its depth at nostrils .68, mid-toe and claw 2.45–2.50. *Hab.* Guam and Saipan, also probably others of the Marianas. Two of the downy young were secured, the general upper coloring of which is brown; there is a buffy spot on each side of the rump; the throat, neck and general under coloring is buffy; a wide and distinct superciliary line of buff; a black line from the upper mandible through the eye; there is a splotch of brown at the nape and another on the sides of the head below the ear; upper mandible black, lower yellowish; feet brownish.

### SUB-FAMILY **FULIGULINÆ**.—SEA DUCKS.

### GENUS **FULIGULA** STEPHENS.

### 15. **Fuligula fuligula** Linn. **Tufted Duck.**

General color black, abdomen white; tail feathers normal, not particularly stiff; head with crest; speculum white. Wing 8, tail 2.5, culmen 1.75, tarsus 1.12. General color of young and females brown. *Hab.* Palæarctic regions from the Atlantic to the Pacific; winters in China, Japan and India; accidental in Polynesia.

## Order HERODIONES.—Herons, Storks, Bitterns, Etc.

**a**$^1$. Bill sharp-pointed and nearly straight, inner side of middle toe-nail pectinate, loral space bare, powder-down tracts present. Family *Ardeidæ*, Herons.

**b**$^1$. Tail feathers 10, bill with serrations, slightly notched.

**c**$^1$. Length about 21, yellowish band down sides of neck, culmen longer than tarsus. Genus *Dupetor*.

**c**$^2$. Length about 14, tibio-tarsus feathered to heel. Genus *Ardetta*.

**b**$^2$. Tail feathers 12 or more, bill without serrations, and usually with a distinct notch, culmen longer than tarsus, length about 22. Genus *Demiegretta*.

### GENUS **DUPETOR** HEINE & REICHENBACH.

### 16. **Dupetor flavicollis** Lath. **Yellow-necked Bittern.**

*Ardea flavicollis*, Lath., Ind. Orn., 1790, II., p. 701.
*Ardea picata*, Raffl., Trans. Linn. Soc., XIII., p. 326.
*Ardea bilineata*, Cuv., Mus. Paris.
*Ardeiralla flavicollis*, Salva., Ucc. Born., 1874, p. 353; Oates, Journ. Straits Branch As. Soc. B. 1990, III., p. 251.
*Dupetor flavicollis*, Hein. & Reichen., Nomencl. Mus. Hein., 1890 (Sumatra), p. 308; Sharp, B. B. O., Club, XXXI., p. 31; *Id.*, Cat. B. Brit. Mus., XXVI., p. 247.

Only one specimen of this large bittern was seen. This was shot near the Agaña river June 11, 1900, and proved to be a full grown female (Bishop Museum No. 8986). Length 22.25, spread of wings 28, wing 8.15, tail 2.92, tarsus 2.43, culmen 3.00, its depth at nostrils .57, mid-toe and claw 2.86. General color of the upper surface olive brown with a slight rufous tint, the under coloring of feathers slate; wings and tail slate; sides of face and cheeks black, mottled with rufous; sides of neck with bands of bright golden straw color; chin and under throat yellowish, with a line of dusky brown feathers extending down the center and broadening out to form the prettily variegated coloring of the under neck and fore breast, which have a general coloring of rufous brown with feathers edged with whitish black and buffy, giving the fore breast a streaked appearance; feathers of belly with under coloring of slate, but the outer half is brownish broadly edged with yellowish, which gives to the under surface a dirty yellowish and brownish appearance; sides and rump slaty; thighs and tibiotarsus rufous; bill dusky above, lighter below; feet a dirty brownish; eyes yellowish. *Hab.* Philippine Islands, China, Burmah, Java, Borneo, Celebes, Sumatra, Malay peninsula, India and Ceylon. This is the first record of this species from Guam.

## GENUS **ARDETTA** GRAY.

### 17. **Ardetta bryani,*** spec. nov. **Kakak. Bittern.**

This little bittern is found in abundance along the streams and in the reedy marshes; taro patches and rice paddies are also its favorite feeding grounds. The native name of Kakak is a very good imitation of the cry it makes as it flys up when disturbed. The coloring of this bird blends so well with its surroundings that it takes very careful observation to see them, of which fact the birds seem well aware and remain perfectly still until they are almost stepped upon, when they fly up, calling out a loud "kaka-kakak". Their food is chiefly insects and their larvæ. Some of the specimens examined had their stomachs filled with black crickets. Eight specimens were secured, two adult males, two adult females, and four immature:—

| *Museum No.* | *Date.* | *Length.* | *Wing.* | *Tail.* | *Tarsus.* | *Culmen.* | *Mid-toe and c.* | *Sex.* |
|---|---|---|---|---|---|---|---|---|
| 9600 | June 5 | 13.50 | 5.25 | 1.68 | 1.86 | 2.00 | 2.12 | ♀ |
| 9601 | June 7 | 14.25 | 5.46 | 1.56 | 1.86 | 2.00 | 1.92 | juv. ♂ |
| 9602 | June 12 | 14.75 | 5.00 | 1.65 | 1.86 | 2.00 | 2.60 | juv. ♂ |
| 9603 | June 12 | 14.00 | 5.50 | 2.00 | 1.92 | 2.00 | 2.17 | ♂ |
| 9604 | June 11 | 14.00 | 5.50 | 2.00 | 1.92 | 2.00 | 2.17 | juv. ♀ |
| 9605 | June 11 | 14.00 | 5.12 | 1.80 | 1.88 | 2.00 | 2.25 | ♂ |
| 9606 | June 13 | 14.50 | 5.25 | 1.75 | 1.75 | 2.12 | 1.96 | juv. ♀ |
| 9607 | July 3 | 14.25 | 5.60 | 1.60 | 1.89 | 2.10 | 2.17 | ♀ |

The spread of the wings from tip to tip is about 19; the depth of the bill at nostril is .40. No. 9603 is type of species. The adult

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*This is probably the *Petit Heron*, Quoy & Gaim., Voy. Uranie, 1824, p. 35 (Guam). Also the bird called *Ardetta sinensis*, Oust., Le. Nat., 1889. p. 261 (Iles Mariannes); Hartert, Nov. Zoöl., V., p. 63; Sharp. Cat. B. Brit. Mus., XXVI., p. 227.

males have the mantle, scapulars, lesser wing coverts and tertials a uniform reddish brown; anterior of mantle slightly darker, with a few feathers having dusky centers and rufous margins; forehead dusky with a slight mingling of rufous; crown and occiput black, the feathers forming a crest about three-quarters of an inch long; sides of head and neck rufous, the long frill-like feathers on the sides of the lower neck with a slight vinous tint; greater and middle wing coverts a light buff; primaries and secondaries slaty black, their under surface grayish, lighter at tips, the outer web of outer primary margined with buff; axillaries and under wing coverts pure white; bastard primary black with buffy outer web; primary coverts black; edge of wing white; tail feathers black, the upper coverts grayish with a slight rufous tint, under tail coverts buffy white; throat, under part of neck, and pendant feathers on under part of lower neck white with slight intermingling of buff; a buffy streak extending mesially down the chin and throat; sides of fore-breast with long dusky feathers having reddish buff margins; sides and belly white with a very slight tint of buff; thighs a buffy white; eyes golden yellow; feet and tarsus a yellowish green; bill dusky above, light below.

The adult female has more red mixed with the black of the crown and occiput, the lower feathers of the crest being entirely rufous with vinous tint; the feathers of the back with lighter margins; general upper surface a dark cinnamon color; the wing coverts are slightly darker than in the adult male, the median streak on the chin is more pronounced, and there seems to be more buffy coloring on the throat and under side of neck, the thighs show more buffy. Otherwise the sexes are identical.

The immature birds are characterized by the streaked appearance of the crown, caused by the black feathers being margined with red. The feathers of the mantle and rump are also a darker reddish brown than in the adult bird; the feathers of the wing coverts are brownish margined with buff, the inner webs being more or less gray, the outer web of the tertials showing a coloring of vinous red; the sides are a darker buff than in the adult and the feathers of the under surface are colored in the centre with reddish brown which gives the under neck, breast and belly a more streaked appearance; eye yellow; bill dusky above, and light below.

This species is closely allied to *Ardetta sinensis* (Gmel.), but is easily distinguished by the uniform reddish brown coloring of the upper surface, the yellowish green of the tarsus, the rufous tint of the upper tail coverts, and the smaller size, the shorter tarsus, and slightly longer culmen, as shown in the table given above. *Hab.* Marianas. Named in honor of my esteemed co-worker in the ornithology of Polynesia, W. A. Bryan, of the Bishop Museum.

## GENUS **DEMIEGRETTA** BLYTH.

### 18. **Demiegretta sacra** (Gm.). **Chuchuku. Reef Heron.**

*Ardea sacra*, Gm., Syst. Nat., I., p. 640; Finsch., Jour. Mus. Godef., VIII., p. 32; Scl., Challenger Exp., II., B., p. 31; Tristr., Ibis, 1882, p. 144 (Solomon Ids.).
*Ardea jugularis*, Forst., Icon. ined. tab. 114; Hartl., J. f. O., 1853, p. 167 (Mariannæ Ids.); Sharp, P. Z. S., 1887, p. 516 (Christmas Id.).
*Herodias grayi*, Gray, List. Grall. Brit. Mus., p. 80 (Aust.).
*Demiegretta grayi*, Gould, Hand. B. B. Aust., II., p. 309.
*Demiegretta sacra*, Wald., Ibis, 1873, p. 318; Grant, P. Z. S., 1888, p. 333; Sharp, Ibis, 1894, p. 245; Hart., Nov. Zool., V., p. 64; Cat. B. Brit. Mus., XXVI., p. 137.

The Reef Herons are not very abundant on the island, and they are extremely wild and difficult to approach. Three specimens were secured, one adult male and two adult females:—

| *Museum No.* | *Date.* | *Length.* | *Wing.* | *Tail.* | *Tarsus.* | *Culmen.* | *Mid-toe and c.* | *Sex.* |
|---|---|---|---|---|---|---|---|---|
| 9585 | June 10 | 25.00 | 11.50 | 4.00 | 3.25 | 3.37 | 2.90 | ♂ |
| 9587 | June 11 | 24.00 | 11.00 | 3.35 | 3.50 | 3.12 | 2.60 | ♀ |
| 9588 | July 14 | 24.00 | 11.00 | 3.68 | 3.00 | 3.30 | 2.86 | ♀ |

The spread of the wings is about 37.50, and the depth of the bill at the nostrils is .56. Sexes colored similarly. The general color of the adult is blackish slate; feathers of the crest and short back plumes tinged with gray in the fully adults; a white streak down the centre of throat, this streak in some specimens beginning between the gonys and extending three inches or more down the neck; in others the white streak begins on a line with the anterior of eye and is only about one inch in length. Specimens almost adult have scattered feathers of a dirty buffy white among the slaty plumage of the mantle, neck, and wing coverts; bill dark above and at the tip, under mandible dusky yellowish; feet and tarsus dusky yellowish green with dark splotches on the front of the tarsus; eye golden yellow. *Hab.* Australia, Pacific islands, Burmah, Malay peninsula, Korea, Bay of Bengal, Japan and China.

## Order PALUDICOLÆ.—Rails, Coots, Etc.

Hind toe above the level of the others, toes long and slender, wings less than 10. Family *Rallidæ*, Rails.

**a**¹. Without frontal shield.

**b**¹. Length about 11, barred with black and white on the under surface, wing more than 3.9. Genus *Hypotænidia*.

**b**². Length about 7, under surface gray, not barred, wing 3.39 or less. Genus *Poliolimnas*.

**a**². With a frontal shield.

**b**¹. Middle toe longer than the tarsus, no webs or lobes on the toes, wing 6.92 or less. Genus *Gallinula*.

**b**². Toes with lobes on the sides, wing 7.70–8.30. Genus *Fulica*.

### GENUS **HYPOTÆNIDÆ** REICHENBACH.

### 19. **Hypotænidia oustini** Oustalet. **Koko. Oustalet's Rail.**

*Hypotænidia marchei*, E. Oustalet, Arch. Mus. Paris (3), 1896, VIII., pp. 32–34.

General color above olivaceous brown; no white spots on mantle or back. In No. 9540 the ends of the feathers on the back of the neck are so worn that they give the appearance of yellowish markings to this region; rump brown; greater wing coverts uniform with the coloring of the mantle; lesser and median wing coverts barred with black and white; primaries, secondaries and tail feathers barred with black and white. This marking on the tail feathers, however, varies considerably. In No. 9536 the tail feathers are almost uniform ochraceous brown with but a few white dots on the webs; top and sides of head uniform with coloring of the mantle; but in No. 9531, however, they are a shade darker than the mantle. A sharply defined superciliary stripe of ashy gray extending from near the base of bill to the sides of nape, the anterior part of this stripe narrow and white. With the exception of this stripe the coloring of the sides of head and neck are uniform with mantle. Beginning sharply on a line with the gape and extending to the shoulders is the plumbous gray of the under neck and breast, merging into white on the chin. Two of the specimens, Nos. 9537 and 9540, show a slight trace of rufous in this plumbous gray of the fore breast. Beginning at the fore breast and extending over the entire under surface of the body, including flanks and under tail coverts, the bird is barred with black and white, these bars especially large and distinct on the flanks, while on the belly they are narrow and not so marked; bill dusky; feet grayish with brownish cast; iris an Indian red. I find no difference in the coloring of the sexes. No. 9538, a fledgling three inches in length, is covered with a uniform sooty black down; bill and feet dusky; eyes dark brown. This bird is closely allied, if not identical with *R. philippinas*. It seems, however, to be a little larger, and without the rufous coloring on the flanks. *Hab.* Marianas.

| *Museum No.* | *Date.* | *Length.* | *Wing.* | *Tail.* | *Tarsus.* | *Culmen.* | *Mid-toe and c.* | *Sex.* |
|---|---|---|---|---|---|---|---|---|
| 9536 | June 24 | 11.50 | 4.48 | 2.06 | 2.84 | 1.37 | 1.84 | ♀ |
| 9537 | June 23 | 13.00 | 5.18 | 2.19 | 2.86 | 1.62 | 2.12 | ♂ |
| 9539 | July 9 | 11.00 | .... | 1.68 | 1.95 | 1.50 | 1.55 | ♀ |
| 9540 | July 15 | 11.50 | 4.50 | 2.00 | 2.00 | 1.50 | 2.10 | ♀ |

### GENUS **POLIOLIMMAS** SHARP.

### 20. **Poliolimmas cinereus** Veill. **Gray Rail.**

*Porphyrio cinereus*, Veill., Nouv. Dict., 1819, XXVIII., p. 29.
*Poliolimmas cinerea*, Sharp, Bul. Brit. Orn. Club, 1893, V., p. 28.

The natives call this bird the Koko, the same name they give to the big Oustins Rail, and they regard it as the young of the latter, which is not at all the case, as the specimen I secured of *P. cinereus* was a fully adult female, with eggs almost ready for laying. These birds are quite rare, and the only specimen I secured was a female which had been snared by some native boys in a sweet potato patch near the Agaña river. General color above olive brown; on top of head the middle of feathers black, with the edges olive brown; a slight intermingling of ash gray showing on the sides of the crown; back of neck olivaceous green; feathers of back with broad black centres and edges of light buffy brown; lores and a small spot at base of gonys black; cheeks, sides of neck, and under neck ash gray merging into white on the chin; a narrow white superciliary stripe which broadens to the base of the upper mandible; a white stripe on the upper edge of cheek extending from chin to ear coverts; cheeks, ear coverts, sides of throat, fore neck, breast, and sides of body ash gray; flanks a buffy brown; belly white; under tail coverts buff; upper tail coverts dusky; under wing coverts and under side of quills ash; axillaries dusky; bastard wing, primary coverts, and quills a light brown; ash below; first primary with outer web whitish; feet yellowish with tint of greenish; eye carmine; bill dusky above, lighter below, with a tint of greenish yellow on the tip of both mandibles. Length 6.50, wing 3.60, extent of wing 11, tarsus 1.30, culmen .75, its depth at nostrils .25, mid-toe and claw 1.83. *Hab.* Guam.

### GENUS **GALLINULA** BRISSON.

### 21. **Gallinula chloropus** Lath. **Pulatel. Gallinule.**

The Water Hen or Moor Hen, Albin, Nat. Hist. B., 1738, II., p. 66, pl. 72.
*Fulica chloropus*, Linn., Syst. Nar., 1766, I., p. 258.
*Gallinula chloropus*, Lath., Ind. Orn., II., p. 773; Steere, List of Mamm. and B. Philip., 1896, p. 258; Hartert, Nov. Zool., V., p. 62.

This bird is abundant in the marshy grounds and taro patches all over the island; it is highly prized by the natives for food. General color a bluish slate, with mantle, rump, wing coverts and upper tail coverts a beautiful olive brown; scapulars like the mantle; primary and secondary quills blackish brown; outer primary and bastard wing feathers externally edged with white; tail feathers blackish; crown and face blackish with a slight blueish tint, which fades into a lighter slaty blue on the neck and fore breast, and extends over the entire under surface of the body; posterior part of belly with a still lighter grayish tint, while in some specimens this part is almost pure white (immaturity). A few white feathers on the sides and flanks; under tail coverts white, with the feathers of the vent and the long median tail coverts black; frontal shield and two-thirds of the bill a deep lake red, anterior third a bright greenish yellow; tarsus lemon yellow; garter of rich lake red followed by a band of lemon yellow just above the knee; joint of the tarsus greenish; toes dusky with a slight tint of yellowish; iris reddish. No. 9595, an immature male, has the feathers of the back of a decided brownish cast; wings and tail dusky; top of head and back of neck brown, more or less mixed with gray on sides of head, face, and neck; chin, throat, lower third of cheeks, and the belly white; the remaining under parts a mingling of white and pale slaty blue; shield much restricted and dusky in color; upper mandible dusky; lower mandible, and tip of upper, with a slight shade of yellowish; legs and feet without the red coloring, but the front scales colored a bright lemon yellow. Quite a lot of grass and remains of insects and larvæ were found in the stomachs of these specimens. *Hab.* Europe, Africa, Asia, and many Pacific islands. Guam.

| *Museum No.* | *Date.* | *Length.* | *Wing.* | *Tail.* | *Tarsus.* | *Culmen.* | *Mid-toe and c.* | *Sex.* |
|---|---|---|---|---|---|---|---|---|
| 9595 | June 7 | 11.31 | 5.55 | 2.12 | 1.86 | 1.18 | 2.75 | juv. ♂ |
| 9594 | June 5 | 12.25 | 6.31 | 2.50 | 2.00 | 1.62 | 2.50 | ♀ |
| 9596 | June 9 | 11.75 | 6.50 | 2.77 | 1.80 | 1.50 | 2.68 | ♀ |
| 9597 | June 11 | 12 50 | 6.37 | 2.26 | 2.00 | 1.68 | 2.75 | ♀ |
| 9598 | June 13 | 12.50 | 6.92 | 3.00 | 1.86 | 1.68 | 3.00 | ♀ |
| 9599 | June 13 | 12.50 | 6.92 | 3.00 | 1.86 | 1.68 | 3.00 | ♂ |

The spread of the wings from tip to tip is about 18.50, and the depth of the bill at the base is about .37.

### GENUS **FULICA** LINNÆUS.

### 22. **Fulica atra** Linn. **European Coot.**

General color slaty, bill and frontal shield whitish, edge of wing and edge of first quill whitish. Length 16, wing 7.70–8.80, culmen 1.70–2, tarsus 2.25–2.35, mid-toe and claw 2.85–3.15. *Hab.* Europe and Asia, ranging south to the Philippines and Pacific islands; accidental on Guam.

## Order LIMICOLÆ.—Shore Birds.

**a**$^1$. Tarsus transversely scutellate, culmen longer than middle toe without claw. Family *Scolopacidæ*, Snipes, Sandpipers.

**a**$^2$. Tarsus with small hexagonal or irregular scales in front, bill shorter than tarsus, nasal openings reaching beyond the basal fourth of the bill. Family *Charadriidæ*, Plovers.

**a**$^3$. Tarsus slightly longer than culmen, lower back and rump white with a black band. Family *Aphrizidæ*, Surf Birds and Turnstones.

### FAMILY **SCOLOPACIDÆ**.—SNIPES

**a**$^1$. No hind toe. Genus *Calidris*.

**a**$^2$. Hind toe present.

**b**$^1$. Culmen thickened at tip, thighs naked, tarsus not so long as mid-toe and claw. Genus *Gallinago*.

**b**$^2$. Culmen longer than mid-toe and claw, tip of bill not decurved, under primary coverts white, toes cleft to the base. Genus *Tringa*.

**b**$^3$. Culmen longer than tarsus, lower parts white, chest streaked or spotted with dusky, tail barred with grayish or dusky. Genus *Totanus*.

**b**$^4$. Wing 6.5 or more.

**c**$^1$. Wing about 8, bill decidedly arched or decurved. Genus *Numenius*.

**c**$^2$. Wing about 6, tarsus equal to the hind toe and claw, axillars grayish, no web between inner and middle toes at base, bill grooved for at least half its length. Genus *Heteractitis*.

**c**$^3$. Wing 7 or more, terminal part of bill smooth and hard, culmen 3 or more, no white on wings. Genus *Limosa*.

### GENUS **GALLINAGO** LEACH.

### 23. **Gallinago megala** Swinh. **Snipe.**

General color above blackish striped with sandy isabelline, breast and abdomen white, a red subterminal band on the tail, tail feathers 20. Length 9.5, culmen 2.3, wing 5.4, tail 2.15, tarsus 1.35. *Hab.* Eastern Siberia, wintering in the Philippines, Borneo and the Moluccas; in the Marianas during migrations.

### GENUS **TRINGA** LINNÆUS.

### 24. **Tringa acuminata** (Horsf.). **Sharp-tailed Sandpiper.**

Legs and feet pale, wings from the carpal joint more than 4.76, the shafts of the quills for a portion of their length are white; top of head is rusty, with streakings and fleckings of dusky; fore neck and chest buff broadly streaked and splotched with dusky; rest of the lower parts white. Length 7.50–8. wing 4.90–5.50, culmen .95–1.05, tarsus 1.10–1.25. *Hab.* West coast of America, islands of the Pacific from Australia to Alaska; Guam during migrations.

### GENUS **CALIDRIS** CUVIER.

### 25. **Calidris arenaria** Linn. **Sanderling.**

General under color white, above light rusty (to ash gray in winter), greater wing coverts broadly tipped with white. Length 7–8.50, wing 4.70–5, culmen .95–1, tarsus .95–1.05, mid-toe and claw .55–.60. *Hab.* Circumpolar; breeds on all coasts of the Arctic ocean, south in winter to Malay archipelago, and Pacific islands; Guam during migrations.

### GENUS LIMOSA BRISSON.

**26. Limosa lapponica baueri** (Naum.). **Pacific Godwit.**

General color of the hind neck and the lower parts plain cinnamon, back and scapulars varied with blackish, whitish and rusty; in winter head, neck and lower parts whitish; the head and neck streaked, the breast and sides slightly barred with grayish brown. Length 14.60–16, wing 8.25–9.15, culmen 3.15–4.70, tarsus 2–2.45, mid-toe and claw 1.10–1.33 *Hab.* Coasts of western Asia and Alaska, south in winter to Australia; Guam during migrations.

### GENUS TOTANUS BECHSTEIN.

**a**$^1$. Wing under 6, central upper tail coverts white. *Totanus glareola.*

**a**$^2$. Wing under 6, no white on rump or upper tail coverts. *Totanus hypoleucus.*

**27. Totanus hypoleucus** Linn. **Common Sandpiper.**

General color a bronzy brown, the feathers with arrow-shaped markings of black; under parts white, with dusky streaks on the throat. Length 8, culmen 1.1, wing 4.1, tail 2, tarsus .89–.96. Female smaller and not quite so well marked. *Hab.* Europe and Asia; Guam during migrations.

**28. Totanus glareola** Temm. **Wood Sandpiper.**

General color above bronze brown, with light ash bronze margins to the feathers; belly white. Length 8.5, culmen 1.15, wing 4.6, tail 1.85, tarsus 1. *Hab.* Europe, Africa, China, Burmah, Malay archipelago; Guam in migrations.

### GENUS NUMENIUS BRISSON.

**a**$^1$. Length about 15, bill less than 4, lower back and rump mottled with bars and spots of brown. *Numenius phæopus variegatus.*

**a**$^2$. Length about 22, bill more than 4, tarsus more than 3. *Numenius cyanopus.*

**29. Numenius phæopus variegatus** Scop. **Oriental Whimbrel.**

Adult bird has a pure white lower back, but the immature birds are streaked with dusky; the crown is a plain brown with a pale mesial streak; lower back much paler than the mantle. Length 15, culmen 3, wing 8, tarsus 2.15. *Hab.* Asia. In migrations it is common in China, Japan, Burmah, Ceylon and Pacific islands; Guam during migrations.

### 30. **Numenius cyanopus** Vieill. **Australian Curlew.**

General color brown, much streaked and blotched; coloring of the rump uniform with the back. Length 21–24, bill 6.8–7.2, wing 11.9–12.5, tail 4–4.6, tarsus 3.2–3.5. *Hab.* Breeds in Siberia; winters in Australia, Borneo, Tasmania, and Malay peninsula.

## GENUS **HETERACTITIS** STEJNEGER.

### 31. **Heteractitis brevipes** Vieill. **Asiatic Wandering Tattler.**

*Heteractitis brevipes*, Vieill., N. Dict. d'Hist. Nat., 1816, VI., p. 410.
*Totanus polynesiæ*, Peale, Zool. U. S. Exp. Exped., 1838, B. p. 237.
*Totanus incanus brevipes*, Seeb. Geog. Dist. of Charad., p. 361.
*Totanus incanus*, Wilson, Aves Hawaiienses, p. 151; Hartert, Nov. Zool., V., p. 65; Oust., II., p. 41.
*Heteractitis brevipes*, Grant, Cat. B. Brit. Mus., XXIV., p. 449.

Specimens of the Wandering Tattler were shot during the months of June and July. They were very scarce and wild, and consequently hard to take. Their notes and habits seemed identical with the American form. The upper coloring of the male is a uniform ashy gray; the rump and tail coverts a shade lighter gray, the latter with indications of cross markings near the tips; primary quills dusky, secondaries gray; tail feathers uniform gray; crown brown, with whitish superciliary stripe which extends to and around the base of the upper mandible; lores dusky; cheeks grayish; throat white. In specimen No. 9524 the sides, under neck and breast are grayish, without cross markings of any kind; the belly, under tail coverts, and flanks are pure white; sides grayish. In No. 9525 the under neck, breast, sides, flanks and lower belly is profusely spotted and barred with dusky gray. Length 10–10.50, wing 6–6.20, tail 2.73–2.75, tarsus 1.16–1.17, culmen 1.43–1.45, mid-toe and claw 1.16. *Hab.* From eastern Siberia and Kamchatka, through Japan and China to Malayan archipelago, Papuan Islands, Marianas and Australia.

## FAMILY **CHARADRIIDÆ.**—PLOVERS.

**a**$^1$. Wings less than 8, plumage without metallic tint, head without crest. Genus *Charadrius.*
  **b**$^1$. Axillars black.—*Charadrius squatarola.*
  **b**$^2$. Axillars smoky gray, or ash gray. *Charadrius fulvus.*
  **b**$^3$. Axillars white, length 7. *Charadrius mongolicus.*

## GENUS **CHARADRIUS** LINN.

### 32. **Charadrius squatarola** (Linn.). **Black-bellied Plover.**

General color black, upper parts irregularly spotted with dusky and whitish, except on the forehead and a line which is pure white to the sides of the breast; in winter the lower parts are white.

Length 10.50–12, bill 1.10, wing 7.50, tarsus 1.95, mid-toe and claw 1.15. *Hab.* Northern parts of the northern hemisphere, south in winter to the Pacific islands.

### 33. **Charadrius fulvus** Gm. **Dululi. Asiatic Golden Plover.**

*Charadrius fulvus*, Gmelin, Syst. Nat., 1788, I., p. 687; Seebohm, Geog. Dist. of Charad., p. 99; Rothschild, Avifauna Laysan, I., p. 11; Hartert, Nov. Zool., V., 66; Oust. II., p. 46.
*Charadrius dominicus fulvus*, Rafll., Trans. Linn. Soc., XIII., p. 328; Ridge. Pro. U. S. Nat. Mus., 1880, p. 198.
*Charadrius dominicus*, Sharp, Cat. B. Brit. Mus., XXIV., p. 191.

The Asiatic Golden Plover was common, both in the inland valleys and along the sea shore, all during the summer months. Many of the specimens were fine adults, with organs in erotic state; the greater number, however, were immature birds. I was informed by a resident sportsman that these birds arrived in great flocks during the fall and spring months. A fine series was secured. Seven specimens with plumage graduating from adult to immature, but apparently full grown birds, give the following measurements:

| *Museum No.* | *Date.* | *Length.* | *Wing.* | *Tail.* | *Tarsus.* | *Culmen.* | *Mid-toe and c.* | *Sex.* |
|---|---|---|---|---|---|---|---|---|
| 9517 | June 9 | 9.50 | 6.25 | 2.42 | 1.75 | .90 | 1.26 | ♂ |
| 9518 | July 2 | 9.50 | 6.60 | 2.35 | 1.60 | 1.00 | 1.25 | ♂ |
| 9519 | July 2 | 9.50 | 6.31 | 2.37 | 1.57 | .98 | 1.21 | ♂ |
| 9520 | July 2 | 9.50 | 6.11 | 2.31 | 1.59 | .95 | 1.27 | ♂ |
| 9521 | July 2 | 9.40 | 6.35 | 2.31 | 1.70 | .95 | 1.27 | ♂ |
| 9522 | July 2 | 9.50 | 6.27 | 2.35 | 1.63 | .95 | 1.25 | ♂ |
| 9523 | July 15 | 10.25 | 6.35 | 2.56 | 1.75 | .92 | 1.26 | ♂ |

General color above (adult males) mottled with black, golden buff and whitish; primaries and secondaries dusky, the shafts of the primaries brown followed by white near the end and tipped with dusky; a frontal band and a distinct eyebrow of white, this white line extending down the sides of the neck to the white on the sides of the body; general under color black, with a few feathers showing buffy or white; axillaries smoky brown; bill and feet dark; tarsus a dusky gray; eye dark brown. *Hab.* (Seebohm) "Breeds on the tundras of eastern Siberia, from the valley of the Yenisei to the Pacific. It passes through Japan, South Siberia, and Mongolia on migrations, and winters in India, Burmah, China, islands of the Malay archipelago, Australia, and the islands of the Pacific, east to New Zealand, west to Heligoland."

### 34. **Charadrius mongolicus** Pall. **Mongolian Sand Dotterel.**

*Charadrius mongolicus*, Pallas, Zoogr. Rosso-Asiat., 1826, II., p. 136; Seebohm, Geog. Dist. of Charad., p. 147; Hartert, Nov. Zool., V., p. 66; Oust., II., p. 48.
*Ægialitis mongolicus* (Pall.), Swinhoe, Ibis, 1870, p. 360.
*Ochthodromus mongolus*, Sharp, Cat. B. Brit. Mus., XXIV., p. 223; Hall, Key to B. Aust., 1899, p. 82.

This bird was very scarce on Guam during the months of my stay (May and August). Only one specimen was seen, which proved to be an adult female, No. 9526. The general color above is a worn light brown with a slight trace of olive green; there is but a slight trace of the rufous color on the fore breast; under parts white; lores dusky; tarsus dark grayish; bill dark; eye dark hazel. Length 7, spread of wings 15, wing 5.06, tail 2.00, tarsus 1.25, mid-toe and claw .95, culmen .63, the terminal vault .33. *Hab.* (Seeb.) "The Mongolian Sand Plover breeds in Asia from eastern Turkestan to the valley of the Amoor, and winters on the coasts from the mouth of the Red Sea to the islands of the Malay archipelago and Australia. Guam.

### FAMILY **APHRIZIDÆ**.—SURF BIRDS AND TURNSTONES.

#### GENUS **ARENARIA** BRISSON.

**35. Arenaria interpres** (Linn.). **Black Turnstone.**

General color dusky, upper parts varied with rufous or white, throat white, head chiefly white, chest black. Length 9–9.90, wing 6, culmen .80–.90. *Hab.* Cosmopolitan, Pacific islands in winter; accidental on Guam.

## Order GALLINÆ.—Gallinaceous Birds.

**a**¹. Hind toe elevated, nostrils never hidden by feathers, tarsi partially or entirely naked. Family *Phasianidæ*.

**b**¹. Tail feathers 8, tarsi without spurs. Genus *Excalfactoria*.

**b**². Tail feathers 14–16, a comb and spurs present. Genus *Gallus*.

**a**². Hind toe on a level with the others, oil glands nude, upper tail coverts not reaching to the end of the tail feathers. Family *Megapodiidæ*.

**c**¹. No white on the basal part of the primaries, head French gray. Genus *Megapodius*.

#### GENUS **EXCALFACTORIA** BONAPARTE.

**36. Excalfactoria sinensis** (Gm.). **Bing-bing. Pigmy Quail.**

These little birds were introduced from Manila in 1894 by Captain Pedro Duarty, of the Spanish Army, and are now very generally distributed over the island. Their favorite feeding grounds seem to be the dry rice paddies and the grassy places on the hill sides. Two specimens, a male and a female, and one set of seven eggs were secured. The size of this little quail is as follows: Total length 5, wing 2.75, tail 1.00, tarsus .80, culmen .43, mid-toe and claw .78. The eggs (Fig. 1, *a.*) are of an enormous size for so small a bird, measuring 1 × .80; they are shaped like the eggs of the common quail of the eastern United States, and are of a brownish color deeply sprinkled over the entire surface by fine deeper brown dots. *Hab.* Philippines, Palawan, Borneo, Java, Sumatra, Australia and Guam.

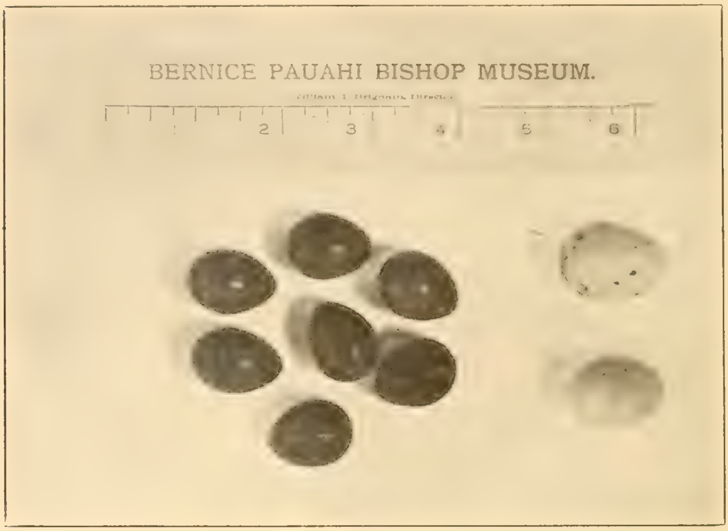

FIG. I.
*a.* Excalfactoria sinensis (Gm.). *b.* Aplonis kittlitzi, F. P. H.

GENUS **GALLUS** LINN.

### 37. **Gallus bankiva** (Temm.). **Jungle Fowl.**

General under color black glossed with green; mantle orange; scapulars, median wing coverts and lower back a dark maroon red; comb emarginate; a wattle on each side of the throat. Length 29, wing 9.5, tail 14, tarsus 3.1. *Hab.* Marianas, Philippines, Palawan, Celebes Islands; also in India, China, Siam, Java, and Malay peninsula.

### GENUS **MEGAPODIUS** QUOY & GAIMARD.

### 38. **Megapodius laperousi** Quoy & Gaim. **Megapode.**

Head French gray, mantle and under parts grayish black shading into a dark olive brown on the wings, bill and legs yellow, naked skin on head red. Length 9.5, wing 7, tail 2.3, tarsus 2. *Hab.* Marianas and Pelew Islands.

## Order COLUMBÆ.—Pigeons.

**a**$^1$. Tarsus feathered for more than half its length, general color green, wings less than 5.19. Family *Treronidæ*, Fruit Pigeons.

**b**$^1$. Forehead and a spot at the base of the lower mandible purple-red. Genus *Ptilinopus*.

**a**$^2$. Tarsus not feathered more than half its length, wing more than 5.19, general color brown or gray. Family *Peristeridæ*, Ground Pigeons.

**c**$^1$. General color brown or olive bronze, length of tail 4 or less. Genus *Phlogœnas*.

**c**$^2$. General color gray, length of the tail more than 5. Genus *Turtur*.

### GENUS **PTILINOPUS** ELLIOT.

### 39. **Ptilinopus roseicapillus** (Less.). **Totot. Rose-crowned Fruit Pigeon.**

*Columba roseicapilia*, Less., Tr. d'Orn., 1831, p. 472.
*Columba purpurata* Kittl. (nec. Gm.), Kupfertaf, 1833, Haft. III., p. 25, t. XXXIII., f. 2.
*Ptilopus roseicapillus*, Ost., Le Natural, 1889, p. 261; Wiglesw., Ibis, 1889, p. 584; *Id.* Aves Polynes., 1891, p. 48.
*Ptilinopus roseicapillus*, Hartert, Nov. Zool., 1898, V., p. 60; Salvadori, Cat. B. Brit. Mus., XII., p. 108.

The Totot, as the natives call this beautifully colored fruit pigeon, is common on the island, and its loud peculiar notes can be heard at almost any time of day from the tall trees along the roadside or in the forest, beginning in a low tone and slow, gradually increasing in volume and rapidity, and then dying away again, like *tot----tot---tot--tot-tot-tot-tot-tot--tot---tot----tot*, and like most of the birds probably gets its native name from the sound it makes. In making this sound they bend the head down so that the bill touches the lower breast, and the top of the neck has the appearance of being puffed up. One kept in a cage some time fre-

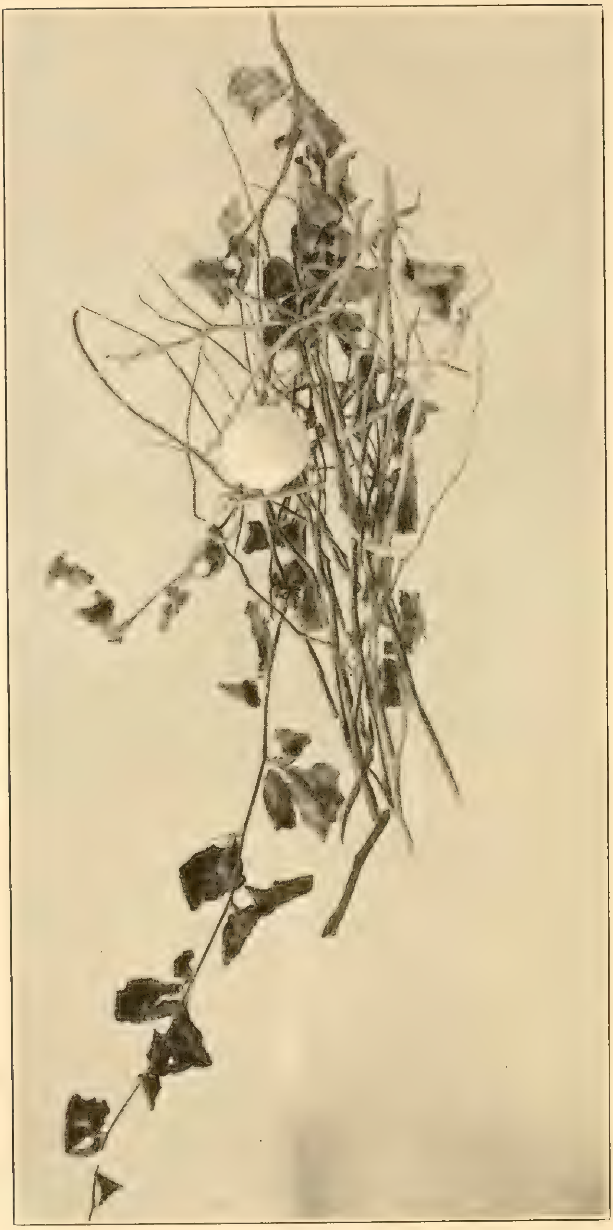

FIG. 2. PTILINOPUS ROSEICAPILLUS (LESS.).

quently made this sound at night. These birds are much hunted by the natives for food, and one would think that they would be very easily seen because of their bright coloring. Such, however, is not the case, for when among the green leaves of the breadfruit trees, which seem to be their favorite haunts, their coloring harmonizes so well with the leaves that they are very difficult to see. Their food consists of wild berries and fruits, all the stomachs containing seeds of the *Linovia trifoliata*. The general color above is a bright green; crown, forehead, and spot at the base of the lower mandible purple-red, margined behind with yellowish; primaries and secondaries green with a glossy reflection, the inner webs purplish, the secondaries margined with a slight line of yellowish; wing coverts green, the greater coverts margined with yellowish; scapulars purplish, margined with yellowish green; chin and throat a yellowish white; sides of head and neck grayish green; breast greenish, with the feathers tipped with pearly gray; a bright purple patch on the middle of lower breast, surrounded by a zone of greenish and orange; belly orange, greenish along the sides; vent and tip of feathers on thigh yellowish; under tail coverts yellowish orange; upper tail feathers green, with a broad yellowish gray distal band margined narrowly with yellow; under coloring of wings and tail gray, the tail feathers showing white markings on the inner webs near the end; under wing coverts gray with a slight mingling of green; bill a pea green; feet and tarsus a dark gray with a tint of purplish; iris gold yellow. I find no difference in the coloring of the sexes. Six specimens selected at random give the following measurements:—

| *Museum No.* | *Date.* | *Length.* | *Wing.* | *Tail.* | *Tarsus.* | *Culmen.* | *Mid-toe and c.* | *Sex.* |
|---|---|---|---|---|---|---|---|---|
| 9488 | May 29 | 9.00 | 5.00 | 2.94 | 1.00 | .55 | 1.19 | ♂ |
| 9489 | June 1 | 9.00 | 5.14 | 3.00 | .96 | .56 | 1.14 | ♀ |
| 9495 | July 11 | 9.05 | 4.92 | 3.00 | 1.03 | .50 | 1.06 | ♂ |
| 9496 | July 11 | 9.00 | 4.90 | 3.00 | 1.00 | .50 | 1.15 | ♂ |
| 9497. | July 20 | 8.95 | 5.00 | 3.00 | 1.03 | .50 | 1.16 | ♀ |
| 9498 | July 20 | 4.00 | 2.90 | 1.00 | .75 | .57 | 1.16 | fledgl. |

The spread of the wings from tip to tip is about 15.25, and the depth of the bill at the nostrils is about .17. The immature, No. 9498, has no red on the head or crown; general upper coloring green with the feathers edged with yellowish; no dark spot on the breast; feathers of the belly yellowish; bill grayish; feet flesh color with a tint of pink; eye light hazel.

Two nests, each containing one egg, were found. These were crude flat structures, constructed of twigs about the size of a knitting needle, very loosely put together and placed on the top of a small branch of the *Triphasia aurantiola*, eight or ten feet from the ground, and how the egg is kept from rolling out when the wind blows is more than I can understand. (See Fig. 2.) The eggs are pure white and look like the eggs of the domestic pigeon. Their size was 1.31 × .85 and 1.12 × .80. *Hab.* Guam, Saipan, Rota.

This bird is somewhat similar to *P. ponapensis*, from Ponape, but the latter has more lilac on the crown and no red at the base of the lower mandible; it is also lighter gray on the neck, and the band on the tail is yellowish in Ponape specimens.

## GENUS **PHLOGOENAS** REICHENBACH.

### 40. **Phlogoenas xanthonura** (Temm.). **Poloman kanau. White-headed Pigeon.**

*Columba pampusan*, Quoy & Gaim., Voy. Uran. Zool., 1824, p. 121, pl. 30.
*Columba xanthonura*, Temm., Pl. Col. 190 (liv. 32, 1823).
*Peristera erythroptera* (part), Cass., U. S. Exp. Ex. Birds, 1853, p. 277.
*Phlegoenas pampusan*, Cat. Brit. Mus., 1893, XX., p. 602; Wiglesw., Aves. Polynes., p. 55.
*Phlegoenas xanthonura*, Hartert, Nov. Zool., 1898, V., p. 60.

These pigeons are common all over the island. Sixteen specimens were secured,—6 adult males, 1 immature male, 8 females, and 1 fledgling. The adult males have the forehead, cheeks, superciliary region, throat and breast pure white; crown, back of neck and ear coverts a rusty rufous. In fully adult breeding birds there is a slight wash of buff on the nape, as in No. 9511; remainder of upper parts olive bronze; anterior part of mantle and the wing coverts with a rich lustre of purple-violet; primaries brown; quills dark; mid-tail feathers brown, the lateral one grayish black with a broad sub-terminal band of black; belly and under tail coverts brown, with some of the feathers slightly tipped with rufous; feet brown, with a slight pinkish tint; bill dark; eye dark hazel. The adult female (type of *Columba pampusan*) has no white coloring at all, the entire body being a uniform rufous brown with a distinct olive lustre on the back; forehead, crown and nape cinnamon; feathers of wing coverts and belly edged with rufous; tail rufous, with a broad sub-apical black band which is not so distinct on the two central feathers; feet brown; eye dark hazel; bill a brownish flesh color. The immature males have a number of dirty white feathers appearing on the breast and throat; sides, top of head and neck deep brown, with an intermingling of a few rufous feathers; the lesser and middle wing coverts with the splendid purple-violet coloring of the adult male, No. 9505; the feathers of the middle wing coverts are tipped with rufous; bill dusky, with a slight greenish cast; feet brown, with a pinkish tint; eyes dark hazel.

These pigeons seem to prefer the deep jungle, from whence their deep low moan, like the sound of a man dying in great distress, comes with a wierd uncanny effect, heightened by the gloom and darkness of the unknown forest. This sound, which always seems to come from a long distance, is very misleading, and one is considerably surprised to find he is perhaps within a few feet of the bird. Their food consists chiefly of the fruit of the Lemonceti (*Triphasia aurantiola*) and a small berry, called by the natives

Tintan-china, one of the Ink-berries, a species of Privet. Both of these are found in abundance all over the island. Six typical specimens give the following measurements:—

| *Museum No.* | *Date.* | *Length.* | *Wing.* | *Tail.* | *Tarsus.* | *Culmen.* | *Mid-toe and c.* | *Sex.* |
|---|---|---|---|---|---|---|---|---|
| 9503 | June 4 | 11.00 | 6.00 | 4.00 | 1.25 | .75 | 1.62 | ♂ |
| 9505 | June 11 | 10.50 | 5.55 | 3.75 | 1.36 | .68 | 1.50 | juv. ♂ |
| 9506 | June 13 | 11.00 | 5.95 | 3.80 | 1.50 | .75 | 1.25 | ♀ |
| 9513 | June 13 | 10.05 | 5.62 | 3.96 | 1.25 | .71 | 1.25 | ♂ |
| 9508 | June 13 | 9.75 | 5.30 | 3.50 | 1.43 | .62 | 1.25 | juv. ♀ |
| 9510 | June 15 | 9.75 | 5.19 | 3.50 | 1.25 | .65 | 1.37 | ♀ |

It will be seen by this that the female is slightly smaller than the male. *Hab.* Marianas.

### GENUS **TURTUR** SELBY.

### 41. **Turtur dussumieri** (Temm.). **Paloman halum-tano. Pigeon.**

*Columba dussumieri*, Temm., Pl. Col. 188 (liv. 32, 1823), Manila.
*Colombe dussumier*, Quoy & Gaim., Voy. Uran. Zool., 1824, I., p. 35.
*Turtur dussumieri*, Salvadori, Cat. Brit. Mus. B., XXI., p. 423; Wiglesw., Aves Pol., p. 54; Hartert, Nov. Zool., V., p. 60.

These birds were probably introduced at an early date from Manila, and they are now (June, 1900) the most abundant *Columbæ* on the island. They are esteemed by the natives as an article of food, and are consequently hunted a great deal. *Hab.* N. E. Borneo, Philippines, Marianas. Three specimens were secured,—one male and two females. Their measurements were as follows:

| *Museum No.* | *Date.* | *Length.* | *Wing.* | *Tail.* | *Tarsus.* | *Culmen.* | *Mid-toe and c.* | *Sex.* |
|---|---|---|---|---|---|---|---|---|
| 9499 | June 8 | 12.00 | 6.60 | 5.60 | 1.00 | .70 | 1.43 | ♂ |
| 9500 | June 8 | 11.25 | 6.00 | 6.00 | 1.00 | .70 | 1.37 | ♀ |
| 9501 | June 14 | 12.00 | 6.36 | 5.12 | 1.00 | .62 | 1.30 | ♂ |

## Order RAPTORES.—Birds of Prey.

**a**¹. Without facial disk of radiating feathers, toes not feathered, plumage compact. Family *Falconidæ*.

**a**². With a facial disk of radiating feathers surrounding the eye, toes feathered, cere more or less hidden by bristles, plumage soft and fluffy. Family *Bubonidæ*.

### FAMILY **FALCONIDÆ**.—HAWKS, FALCONS, ETC.

**a**¹. Culmen greater than half the length of the middle toe without claw. Genus *Astur*.

**a**². Culmen measured from margin of cere less than half the length of the middle toe without claw. Genus *Accipiter*.

### GENUS **ASTUR** LACÉP.

#### 42. **Astur sharpi** Oust. **Sharp's Hawk.**

One specimen of this species was brought back by the Astrolabe expedition, but it may not have been from the Marianas. I made special efforts to find this hawk, but without success. It probably is not found on Guam. *Hab.* Marianas(?).

### GENUS **ACCIPITER** BRISSON.

#### 43. **Accipiter nisoides** Blyth. **Variegated Hawk.**

One specimen of this species was taken on Guam by Mr. Ouston's Japanese collectors. No rufous collar, ear coverts gray, no white spot on the central tail feathers, breast rufous. Length 11, culmen .75, wing 6.6, tail 5.1, tarsus 1.9. Female is slightly larger. *Hab.* Eastern Asia, Indo-Malayan sub-region, Northern China, Papuan Islands; incidentally on Guam.

### FAMILY **BUBONIDÆ**.—HORNED OWLS.

Wings more than 10, cere equal to the chord of the culmen, ear openings very large. Genus *Asio.*

### GENUS **ASIO** BRISSON.

#### 44. **Asio accipitrinus** (Pall.). **Short-eared Owl.**

It is very doubtful if there has ever been an owl taken on the Marianas. It is not found on Guam. (See Nov. Zool., V., p. 51.)

## Order COCCYGES.—Kingfishers, Etc.

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**a**¹. Bill with rounded or slightly flattened culmen, third toe united with the fourth for more than half its length, the second united to the third for its basal third, bill not serrated, caeca none. Family *Alcedinidæ.*

**b**¹. Tail longer than bill, with a more or less distinct groove along the sides of the culmen, bill compressed. Genus *Halcyon.*

**c**¹. Head white, flanks pure white, a band of green behind the eye and around nape. *Halcyon albicilla.*

**c**². Head cinnamon, the colorings of the under surface also cinnamon, except in the female, which has white on the under parts. *Halcyon cinnamominus.*

## GENUS **HALCYON** SWAINS.

### 45. **Halcyon albicilla** Dumont.

General color above a bright blue; under surface, whole of head and neck white; from behind the eye above the ear coverts runs a streak of blue. Length 11, culmen 2.3, wing 4.9, tail 3.1, tarsus .07. Female similar in color. *Hab.* New Guinea, Solomon Islands, Louisiades, Saipan; not on Guam.

### 46. **Halcyon cinnamominus** Swains. **Sehig.**

*Dacelo ruficeps*, Cuv., Gal. du Mus., Less. d'Orn., 1831, p. 247.
*Alcedo ruficeps*, Cuv., Pucher, Rev. & Mag. Zool., 1853, p. 387. (Marianas; *gleich cinna mominu* Swains.)
*Halcyon cinnamominus*, Finsch., Jour. Mus. Godff., 1876, XII., p. 20; Sharp, Brit. Mus. Cat. B., XVII., p. 259.
*Halcyon rufigularis*, Sharp, Brit. Mus. Cat., XVII., p. 260.

These birds are very common near the native ranch houses and the villages. They are especially noticeable because of the loud and disagreeable noise which they are constantly making, both night and day. They are especially abundant near the city of Agaña, and their noisy kaa-kaa-kaa-kaa frequently aroused me from sleep at the unconventional hours of two and three o'clock in the morning. I was informed that Governor Leary was so exasperated by these disturbers of the night that he ordered a squad of native soldiers out to kill off all near the palace, but judging from the noise still to be heard the attempt was not an entire success. The birds make this noise just as they fly up, seeming to think it an essential part of the proceedings. Even if the distance to fly is only two feet it must be proclaimed by this jangling kaa-kaa, which is almost as unpleasant a sound as the braying of an ass. Sehig, as the natives call this bird, has a bad reputation as a chicken thief. I rather doubted his ability in this line until one day I actually saw him attack a brood of small chicks quite near me, and he would have undoubtedly secured one had not the mother hen rushed to the rescue. The chief food of this species seems to be, however, lizards and grasshoppers. I have seen them catch a lizard and then, flying into a tree, by a dexterous shake of their big bill hammer the victim against the limb of the tree until its life was extinct, after which they would proceed very leisurely to devour it, and then go to sleep. After eating, these birds are very loath to fly, and will allow one to approach within a step or two of them. The breadfruit tree is their favorite resting place. Six specimens were secured, three adult males and three adult females. The adult males have the mantle greenish blue; rump and upper tail coverts a slight degree lighter than the mantle; wings bluer than mantle, the quills blackish, more or less blue on the outer webs, the first primary with only a faint trace of bluish;

tail feathers blue; head, hind neck and entire under surface of body a uniform cinnamon; ear coverts are long tufts of dusky feathers with a tint of greenish blue; a dusky band extending from ear coverts entirely around the back of the head, forming a nuchal band; eye dark hazel; bill a dark horn, except posterior third of lower mandible which is light. The adult female (type of *Halcyon rufigularis*, Sharp) is similarly colored, but has only the throat, head, chest and thighs, cinnamon; the breast, belly, sides of body, under wing coverts and under tail coverts white. In some specimens there is a slight mixture of cinnamon on the upper tail coverts, and also a faint buffy tint on the sides. The cinnamon color of the females is not quite so bright as on the males. The measurements of the specimens taken were as follows:—

| *Museum No.* | *Date.* | *Length.* | *Wing.* | *Tail.* | *Tarsus.* | *Culmen.* | *Mid-toe and c.* | *Sex.* |
|---|---|---|---|---|---|---|---|---|
| 9545 | May 30 | 9.00 | 4.30 | 3.00 | .75 | 1.67 | 1.00 | ♂ |
| 9546 | May 30 | 10.00 | 4.60 | 3.24 | .75 | 1.67 | 1.00 | ♂ |
| 9547 | May 30 | 9.75 | 5.00 | 2.93 | .67 | 1.58 | 1.70 | ♂ |
| 9548 | May 30 | 10.00 | 5.18 | 3.25 | .60 | 1.81 | 1.60 | ♀ |
| 9549 | May 30 | 10.50 | 4.00 | 3.28 | .62 | 1.67 | 1.60 | ♀ |
| 9550 | June 4 | 10.00 | 4.00 | 3.00 | .67 | 1.57 | 1.00 | ♀ |

The extent of the wing is about 14.50; the depth of the bill at the nostrils is about .57. *Hab.* Island of Guam.

## Order MACROCHIRES.—Swifts, Goatsuckers, Etc.

**a**¹. Tarsi and toes naked, tail slightly forked, color dusky. Family *Cypselidæ*.

**b**¹. Shafts of the rectrices ordinary and without spinous points. Genus *Collocalia*, Gray.

### 47. Collocalia fuciphaga (Thunb.). Jajaguag. Swift.

*Hirundo vanikorensis*, Quoy & Gaim., Voy. Astrolabe, Zool., 1830, I., p. 206.
*Collocalia fuciphaga*, Cat. B. Brit. Mus., XVI., p. 499; Oust., I., p. 187; Hartert, Nov. Zool., V., p. 53.

These birds are quite common, especially over the grassy hills, where they could be constantly seen hawking about for insects. I never have seen them alight. Many caves on the island were searched in the hope of finding the nests and eggs, but I was unsuccessful, although the birds doubtless nest on the island in large numbers. The upper surface is a sooty brown with a slight gloss; the head is uniform with the coloring of the mantle, with a little deeper gloss; the wings and tail are darker; the under surface is brownish gray; there is a small spot of grayish in front of the eye; bill and feet dusky; eyes dark hazel. The four specimens secured measured as follows:—

| *Museum No.* | *Date.* | *Length.* | *Wing.* | *Tail.* | *Tarsus.* | *Culmen.* | *Mid-toe and c.* | *Sex.* |
|---|---|---|---|---|---|---|---|---|
| 9529 | June 1 | 4.17 | 4.18 | 2.00 | .43 | .17 | .31 | ♂ |
| 9530 | June 6 | 4.00 | 4.25 | 2.06 | .31 | .17 | .28 | ♀ |
| 9531 | July 10 | 4.12 | 4.36 | 2.00 | .42 | .18 | .... | ♀ |
| 9532 | July 17 | 4.00 | 4.33 | 2.00 | .42 | .18 | .... | ♂ |

The spread of the wing is about 10, and the depth of the bill at nostrils is .06. *Hab.* The islands of the Malay Archipelago, north to the Philippines, Western Himalayas to the Nilgherries, Ceylon and the Seychelles in the west, islands of Santa Cruz and Duke of York, Sumatra, Borneo and Marianas.

# Order PASSERES.—Perching Birds.

**a**$^1$. Bill broadened, flat, with rectal bristles at base. Family *Muscicapidæ*, Fly-catchers.

**b**$^1$. Tail longer than wings. Genus *Rhipidura*.

**b**$^2$. Wings longer than tail, bill equal to hind toe without claw. Genus *Myiagra*.

**a**$^2$. Bill like that of a thrush, wings rounded and short—not more than 3.30, general color an olive brown. Family *Timeliidæ*, Babbling Thrushes.

**c**$^1$. Tail of 12 feathers, the outside one less than .25 shorter than the longest, a minute bastard primary. Genus *Acrocephalus*.

**a**$^3$. Bill moderate, or very slightly hooked at tip.

**d**$^1$. Nasal feathers erect or inclined backward, bill conical and elongate, hind claw stronger than claw of middle toe. Family *Sturnidæ*, Starlings.

**e**$^1$. Color black, length about 9.50, immature streaked with yellowish. Genus *Aplonis*.

**d**$^2$. Nasal feathers directed forward, bill strong and curved, wing more than 4. Family *Corvidæ*, Crows.

**e**$^2$. Black, length about 15. Genus *Corvus*.

**d**$^3$. Nasal openings in long soft grooves, tongue brush tipped. Family *Meliphagidæ*, Honey-eaters.

**e**$^3$. General color red. Genus *Myzomela*.

**e**$^4$. General color yellow.

**f**$^1$. Eye with white ring. Genus *Zosterops*.

**f**$^2$. Eye without ring. Genus *Cleptornis*.

### GENUS **RHIPIDURA** VIGORS & HORSFORD.

**a**[1]. "Bases of all the tail feathers, rump and upper tail coverts rufous, length 4.94." *Rhipidura saipanensis.*

**a**[2]. Bases of the tail feathers, rump and upper tail coverts a bright rufous, length 5.50–6.25. *Rhipidura uraniæ.*

### 48. **Rhipidura saipanensis** Hart.

Mr. Hartert, in Nov. Zool., 1898, V., p. 54, describes the *Rhipidura* from the island of Saipan as a new species. I have no specimens from Saipan, but in description they are characterized as having the base of rectrices rufous; rump and upper tail coverts rufous; sides of abdomen rufous; ear coverts, line under eye, and lores black; all of which is most certainly true of the *R. uraniæ*, which I now have before me. These were taken on the island of Guam during the months of June, July and August, 1900. The measurement of *R. saipanensis* is given as (male): "Length 151 mm., wing 69 mm., tail 80 mm., bill 8 mm., tarsus 19 mm. *Hab.* Island of Saipan, Marianas."

### 49. **Rhipidura uraniæ** Oust. **Chirita. Fan-tailed Fly-catcher.**

*Rhipidura uraniæ*, Oustalet, Bul. Soc. Philom de Paris, V., p. 75; Wiglesw., Aves Polynes., 1891, p. 20.

This is one of the most interesting little birds on the island, and they were so abundant that it was quite unusual to walk half a mile along the road without seeing at least a pair of them, or hearing their sweet little song which consists of about six low musical notes. It also makes a peculiar charring sound to warn people away from its nest. The following account was written in the field as I watched the bird and is copied from my field notes of June 28:

"'Seated in the brush waiting to hear the warble of Ga-kalison, 'The Dweller among the Reeds' (*A. lucinia*), I have a good opportunity to watch and compare the notes and habits of the two Guam fly-catchers, *R. uraniæ* and *M. freycineti*, which are now feeding within six feet of me. *Uraniæ* is extremely active, and as compared to it the movements of *Freycineti* are very slow and clumsy. *Uraniæ* has the most astonishing way of whirling around and alighting just the other end on from what one expects. In this instance it was as polite as a Spaniard, and always faced towards me, spreading its beautiful fan-like tail and making a low chirping note. Not so the *Freycineti*, who looked me over critically, elevated his head crest, and giving his tail an odd little twerk, proceeded to hop deliberately up the limb like a sap-sucker, busy at work looking for breakfast. However, I saw him catch a few insects on the wing, his wide curious looking bill closing with a loud snap. *Uraniæ* caught most of his breakfast on the wing, darting about the bushes in a way that made me suspect he was showing off, and putting the more clumsy *Freycineti* in as bad a light as possible. I was not fooled, however, for with such a fine rudder as his tail makes it is but natural that he should be able to change his course rapidly. Sometimes he seemed to whirl about merely for the fun of whirling.''

Three adult males, three adult females, a young bird about ready to fly, and a nest were taken. The adults measured as follows:

| *Museum No.* | *Date.* | *Length.* | *Wing.* | *Tail.* | *Tarsus.* | *Culmen.* | *Mid-toe and c.* | *Sex.* |
|---|---|---|---|---|---|---|---|---|
| 9470 | May 30 | 6.25 | 2.68 | 2.81 | .81 | .43 | .50 | ♂ |
| 9471 | May 30 | 6.00 | 2.81 | 3.00 | .83 | .43 | .53 | ♂ |
| 9472 | June 1 | 5.50 | 2.50 | 2.75 | .80 | .41 | .50 | ♀ |
| 9473 | June 6 | 5.90 | 2.62 | 2.82 | .84 | .42 | .56 | ♂ |
| 9474 | July 6 | 5.50 | 2.65 | 2.75 | .80 | .39 | .56 | ♀ |
| 9475 | July 9 | 5.50 | 2.50 | 2.75 | .80 | .45 | .56 | ♀ |

The spread of the wings is about 7.75, the depth of the bill at nostrils is about .12. The adult birds on the upper surface are an ochraceous brown, becoming a bright rufous on the rump; upper tail coverts and bases of rectrices are a bright rufous; the tail feathers, which are exceptionally wide and long for such a small bird, are a shining dusky brown, almost black; primaries and secondaries are a soft brown, slightly darker than the mantle—the outer webs are slightly fringed with red; under surface of wing a lighter brown. No. 9472 has the greater and middle wing coverts tipped with rufous, thus forming two rufous bands on the wings; but in the other specimens these bands are very indistinct, or entirely worn off; forehead a bright rufous, slightly dusky around base of upper mandible; the bright rufous of the forehead merging into the ochraceous brown on the crown; the feathers of the crown with dusky centres. In my series the females do not show the dusky centres to these crown feathers, although the bases of the feathers are dusky as in the male. I doubt, however, if this difference would hold good in a large series, and apart from this slight point I find the sexes identical. Throat and under neck black, the feathers assuming white tips on the breast; hind breast and belly white, with rufous tint; sides, flanks, thighs and under tail coverts rufous; chin grayish white, with a whitish irregular line extending from the base of the gonys down the sides of the throat; otherwise, cheeks, lores and ear coverts dusky; eye dark hazel; feet dark brown; bill dusky, except on the gonys, which are grayish. The nestling secured has the upper surface thickly covered with filmy feathers of a soft rufous brown; under parts grayish with rufous tint. *Hab.* Island of Guam.

The nest is very interesting, neatly and very compactly woven in and out with fine vegetable fibre; the outside is covered with a fine padding of material resembling the paper fibre made by wasps. The nest has a very curious projection of fibres extending from the bottom. This pretty little structure is usually built in the Mapuna tree, where a number of branches converge some ten or twenty feet from the ground. Inside the nest measures 1.53×1.50, while its depth is .85; outside it measures 1.83×1.85, with a depth of 2.50. (Fig. 3.)

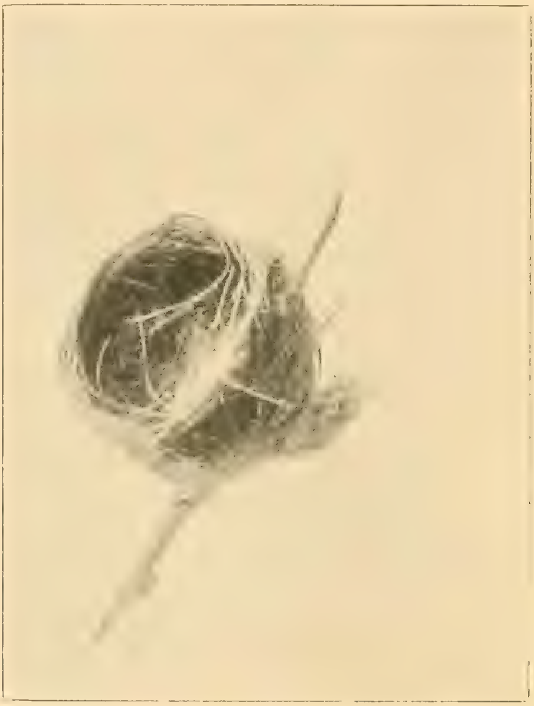

FIG. 3. RHIPIDURA URANIÆ, OUST.

## GENUS **MYIAGRA** VIGORS & HORSFIELD.

### 50. **Myiagra freycineti** Oust. **Chigunguan. De Freycinet's Fly-catcher.**

*Myiagra freycineti*, Oust., Bul. Soc. Philom., 1881 (7), V., p. 73; *Id.*, Naturaliste, 1889, p. 260; Wiglesw., Aves Polynes., p. 24; Hartert, On the Birds of the Mariana Islands, Nov. Zool., V., p. 54.

The little De Freycinet's Fly-catcher is common in all parts of the island. Upon first hearing the notes of this bird I thought surely a Bush-tit, by some strange accident, had arrived on the island, the clear-whistled call of Peter-Peter-Peter seemed so unmistakable. Sometimes he varies this call by whistling three Here-Here-Here, followed by the first call. They have a habit of erecting the beautiful metallic-blue feathers of the head as a crest when they are alarmed. The general color above is a blue-purple, with a bluish sheen, head with a deeper, more metallic reflection of bluish, this color extending over cheeks, ear coverts, nape and sides of neck, meeting the white under coloring of the chin and throat in a sharp line from gape to shoulders; a slight tint of buffy on the lower throat and fore breast; remainder of under parts white; primaries, secondaries, and tail feathers gray, with a bluish tint, lighter below; upper wing coverts and upper tail coverts uniform with coloring of the mantle; all the tail feathers minutely tipped with white (this marking is worn off in some of the specimens before me); bill dark blue; feet and tarsus dark, with a bluish cast; eyes dark hazel; thighs bluish gray; flanks and sides of body bluish gray, with the feathers tipped with white. So far as shown by my series of ten specimens the adult males and females are exactly alike, with a possible exception of a little more of the rufous coloring on the throat and fore breast of the female. In No. 9484, an adult male, this coloring is confined to a faint trace of buffy on the lower throat and fore breast, while in No. 9486, a breeding female, the coloring of the fore breast and throat is a bright rufous as in the immature of both sexes. No. 9485, a male with the testes fully developed and erotic, has the usual purple-blue upper coloring of the adult males, while the entire throat, sides of neck and breast are a bright rufous; there is also a slight mixture of rufous among the white feathers of the abdomen. Thus the specimen is a typical adult above, and immature below. Six specimens, selected at random, give the following measurements:—

| *Museum No.* | *Date.* | *Length* | *Wing.* | *Tail.* | *Tarsus.* | *Culmen.* | *Mid-toe and c.* | *Sex.* |
|---|---|---|---|---|---|---|---|---|
| 9478 | May 29 | 5.50 | 2.49 | 2.31 | .81 | .55 | .51 | im. ♂ |
| 9482 | June 9 | 5.25 | 2.75 | 2.25 | .75 | .56 | .55 | ♀ |
| 9483 | June 26 | 5.50 | 2.68 | 2.31 | .75 | .55 | .60 | ♀ |
| 9484 | June 26 | 5.50 | 2.81 | 2.37 | .74 | .52 | .62 | ♂ |
| 9485 | June 26 | 5.65 | 2.68 | 2.37 | .75 | .56 | .60 | ♂ (Note) |
| 9486 | July 20 | 5.70 | 2.75 | 2.36 | .75 | .56 | .55 | ♀ |

The spread of the wings is about 8.50, while the depth of the bill at the nostrils is .15.

The immature are easily distinguished by the ochraceous brown coloring of the mantle, and by the greater extent of the bright rufous of the under parts, which with the exception of a small white space on the middle of the belly and the white under tail coverts is entirely rufous, brightest on the sides of the fore breast, paler on the chin and sides; there is a slight rufous coloring on the forehead and on the upper tail coverts. The color of the crown is not such a bright metallic blue as in the adult; the wing and tail feathers are a brown on the upper surface, lighter below; the edges of the webs are more or less rufous or buffy, according to the age of the specimen; wing coverts brown, more or less edged with rufous; bill and feet dark, with bluish cast.

The nest and egg of this species were secured for me by a Chamorro lad. This particular nest is quite interesting from the fact it has a ring of wax, from the breadfruit tree, around the top, by which means the boy had endeavored to take the old bird. The inside measurements are 1.35×1.75 and .75 in depth; outside 2×2 and depth 1.75. (Fig. 4.) It contained two eggs, brownish cream in color, zoned near the larger end with cinereous spots and small irregular blotches; size .70×.50. *Hab.* Guam.

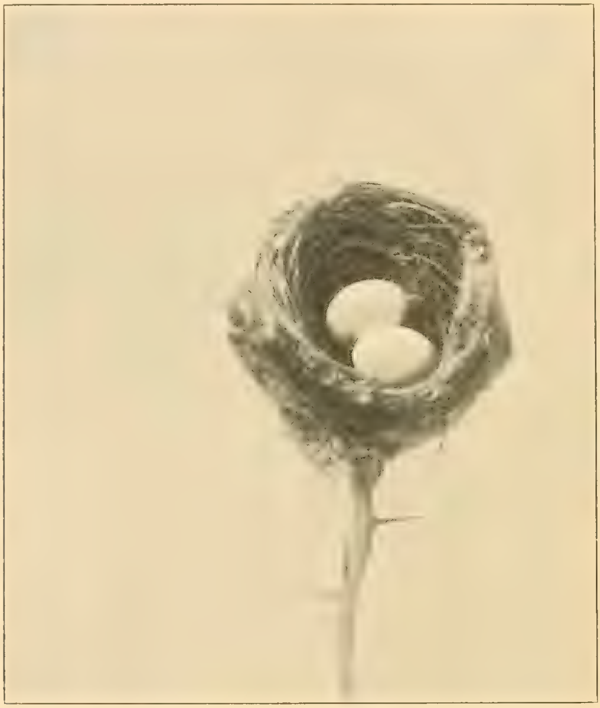

FIG. 4. MYIAGRA FREYCINETI, OUST.

### GENUS **ACROCEPHALUS** NAUMANN.

**a**[1]. Tail feathers without dusky cross bars, upper surface uniform brown. *Acrocephalus syrinx.*

**a**[2]. Tail feathers with dusky cross bars, upper coloring olive brown. *Acrocephalus lucinia.*

### 51. **Acrocephalus syrinx** Kittl.

Mr. March found this species on Pagan Island, where it was probably accidental. General color above uniform ruddy brown, under surface yellowish white. Length 6.8, wing 3, tail 2.50, culmen .95–1, tarsus 1.05. *Hab.* Isle of Ponape, Carolines.

### 52. **Acrocephalus luscinia** (Quoy & Gaim.). **Ga-kaliso. Reed Warbler.**

*Thryothorus luscinus*, Quoy & Gaim., Voy. Astrolabe, 1830, I., p. 202.
*Acrocephalus mariannæ*, Trist., Ibis, 1883, p. 45.
*Tatare luscinia*, Oust., Nouv. Arch. Mus. Hist. Nat., Ser. III., Vol. VIII., p. 209.
*Acrocephalus luscinia*, Hartert, Nov. Zool., V., p. 57.

This bird is now quite scarce, and I predict will soon become extinct on the island of Guam. It lives exclusively among the reedy swamps, and these swamps are now being drained to make room for the Chinamen's rice paddies. Ga-kaliso, "The Dweller Among the Reeds," as this name signifies, is the most beautiful singer in all the islands. Early in the morning usually, from among the tall reeds his liquid sweet song can be heard, the notes rising and falling in happy cadence, reminding one very much of the Mocking Bird of the southern United States. These birds are very hard to distinguish in the field as they are so nearly the color of the reeds, the only way to locate them being by their melodious voices. This made the shooting of them a hard task, for to kill a bird with so sweet a voice made one feel as if he were committing a great crime. Four specimens were taken. Their stomachs contained the remains of a great many insects and larvæ. I frequently watched them feeding among the reeds. Three of these birds were males, and one female. Their measurements are as follows:—

| *Museum No.* | *Date.* | *Length.* | *Wing.* | *Tail.* | *Tarsus.* | *Culmen.* | *Mid-toe and c.* | *Sex.* |
|---|---|---|---|---|---|---|---|---|
| 9541 | June 1 | 8.50 | 3.23 | 3.00 | 1.19 | 1.25 | 1.00 | ♂ |
| 9542 | June 26 | 8.12 | 3.37 | 3.00 | 1.20 | 1.25 | 1.05 | ♂ |
| 9543 | July 9 | 8.50 | 3.30 | 2.62 | 1.15 | 1.18 | 1.06 | ♀ |
| 9544 | July 9 | 8.20 | 3.18 | 2.68 | 1.18 | 1.18 | 1.03 | ♂ |

The spread of the wings is about 10.25, the depth of the bill at the nostrils is about .18. The general coloring above is a uniform olive brown, with a slight rufous tint; the primaries are a darker brown than the mantle. In No. 9542, an adult male in fine breeding plumage, the tail being darker than the mantle; while in the other specimens it is not. The tail and wing feathers, if held in a certain light, show slight cross bands; rump more or less yellowish, much brighter in the females and young males; a yellow superciliary line and lores; the entire under surface is yellowish; thighs rufous; sides of body and flanks rufous and gray; bill brown above, yellowish below; feet and tarsus brownish gray; eye dark hazel. The females and the young are colored almost alike and are characterized by the more rufous coloring in general; the rufous outer webs to the primaries and the very dark color of the inner secondary; this latter character much more distinct in the female than in the young males; the feathers of the thighs are also much brighter rufous in the females. The general under coloring of the feathers in this species is a dark gray, so that the outer coloring of the feathers depends largely upon how much of the brownish or yellowish tip is worn off. This is well illustrated by No. 9541, an old male with the plumage so worn as to give the bird the appearance of being gray, with rufous tint. *Hab.* Guam, Saipan.

### 53. Aplonis kittlitzi F. & Har. Sali. Starling.

*Calornis kittlitzi*, Finsch. & Hartl., Fauna Central Polyn., 1867, p. 109.
*Aplonis kittlitzi*, Cat. B. Brit. Mus., XIII., p. 136.

This bird is common on the island of Guam. In color and actions they very much resemble the blackbird of the eastern United States. They are noisy and quarrelsome, especially when there are any of the young birds about. Their food seems to consist chiefly of the fruit of the wild papaya. They build their nests in the hollow of a tree, usually choosing the dead trunk of a coconut for this purpose, and laying four, sometimes three eggs. Fourteen specimens of this species were taken. The immature bird, with its streaked breast, might be easily mistaken for a distinct species. The adult bird, both the male and female, is a uniform black all over the body, with a slight greenish sheen to the feathers; bill, feet and tarsus black; the shafts of the wing feathers and the rectrices are black on the upper surface, white on the sides, and brownish below; this is especially noticeable on the tail feathers and the secondary wing feathers; under surface of wings and tail dusky, but not quite so dark as the body; eyes golden yellow. Length 9.25–9.75, wing 4.56–5.00, tail 3.17–3.60, tarsus 1.25–1.37, culmen .93–.87, mid-toe and claw 1.19–1.20 *Hab.* Guam.

| *Museum No.* | *Date.* | *Length.* | *Wing.* | *Tail.* | *Tarsus.* | *Culmen.* | *Mid-toe and c.* | *Sex.* |
|---|---|---|---|---|---|---|---|---|
| 9552 | May 24 | 9.50 | 5.00 | 3.37 | 1.37 | .93 | 1.25 | ♂ |
| 9553 | May 24 | 9.00 | 4.56 | 3.60 | 1.25 | .93 | 1.19 | ♀ |
| 9554 | May 30 | 9.75 | 5.00 | 3.31 | 1.27 | .81 | 1.19 | ♂ |
| 9555 | May 30 | 9.50 | 4.67 | 3.17 | 1.30 | .87 | 1.20 | ♀ |
| 9556 | May 30 | 9.25 | 4.62 | 3.25 | 1.25 | .87 | 1.14 | ♀ |
| 9557 | May 30 | 9.50 | 4.50 | 2.85 | 1.17 | .87 | 1.17 | juv. ♀ |
| 9558 | July 3 | 8.50 | 4.60 | 2.50 | 1.17 | .85 | 1.26 | juv. ♂ |
| 9559 | July 11 | 9.50 | 4.75 | 3.25 | 1.25 | .86 | 1.30 | juv. ♂ |
| 9560 | July 11 | 9.00 | 4.62 | 2.63 | 1.12 | .86 | 1.30 | juv. ♀ |
| 9561 | July 11 | 9.00 | 4.50 | 3.00 | 1.25 | .86 | 1.10 | juv. ♀ |

The immature of this bird has the upper surface dusky, but not so dark as in the adult; there is also a greenish sheen to the feathers on the upper surface; the upper sides of the rump have more or less of a mingling of bright buffy; the entire under surface has a streaked appearance, caused by the feathers having dusky greenish centres, with margins of buffy white; this streaking is very fine on the chin and throat, broader on the breast and belly. Still younger specimens have less of buffy on the breast and throat; bill and feet dusky; eye yellow. No. 9562, a big nestling, almost ready for flight, has the upper surface black without the greenish sheen; the feathers of the throat are dusky without the buff coloring; the breast is a dirty buff and dusky; the belly is chiefly a dirty buff; bill dark, with a little lighter shade on the lower mandible; feet, wings and tail dark; eyes brownish. No. 9563, which is just assuming the first plumage, has fine black feathers emerging from their sheaths, the back has acquired a fair degree of plumage, but the breast and belly are still bare, with a fringe of dirty buffy feathers along the sides. When first hatched the young are entirely naked. The eggs (Fig. 1, *b.*) are pale green, with brown irregular spots about .15 in diameter scattered sparsely over the entire egg, being most abundant on the larger end. These eggs measured 1.27–1.15×.95–.85. *Hab.* Marianas.

### 54. **Corvus kubaryi** Rchw. **Aga. Kubary's Crow.**

*Corvus solitarius*, Kittl., Reise, 1858, II., p. 143.
*Corone philippina*, Wiglesw., Aves Polynes., p. 46.
*Corvus kubaryi*, Rchw., Journ. f. Orn., 1885, p. 110; Hartert, Nov. Zool., V., p. 59.

This species is common in the jungles, where they soon attract attention by their noise. They are not at all wild, so I was able to approach quite near, and observe them carefully. I did not discover any new tricks—they pulled up the newly planted corn of the native in the same old way and with apparent satisfaction. They have the reputation of plundering the nests of the smaller birds in order to eat the eggs and young, and they do not seem to sound the same straightforward Caw, Caw of our American crow, for they have a sort of Polynesian twist to their tongue which makes them very hard to understand, and sounds like Qu a á Qu a á. Five specimens were secured, but owing to an accident four of them were destroyed. The remaining specimen, No. 9487, an adult female, is a deep black all over, including bill, feet and tarsus. There is a fine bluish black sheen or gloss to the feathers of the mantle, wings and tail; head a shiny black without a noticeable blue gloss; under parts a dead black color; the under color of the feathers all over the body is white or light gray; so if the outer half or two-thirds of the feathers were worn off we would have a white crow. Length 15.00, spread of wings 26.00, wing 9.50, tail 6.12, tarsus 2.00, culmen 1.80, mid-toe and claw 2. Eye dark hazel. *Hab.* Guam.

## GENUS **MYZOMELA** FINSCH.

### 55. **Myzomela rubratra** (Less.). **Egigi. Red Honey-eater.**

*Cinnyris rubrater*, Less., Voy. Coq. Zool., 1826, p. 678.
*Myzomela rubratra*, Finsch, Journ. Godeffroy Mus., XII., p. 26; Oust., I., p. 197; Hartert, Nov. Zool., V., p. 55; *Id.*, VI., p. 2; Gadow, Cat. B. Brit. Mus., IX., p. 129.

The beautiful little red and black Egigi, as the natives call this Honey-eater, is probably the most abundant bird on Guam. They are quite fearless and are frequently to be seen in the gardens of the villages, the tall coconut palms being, however, their favor-

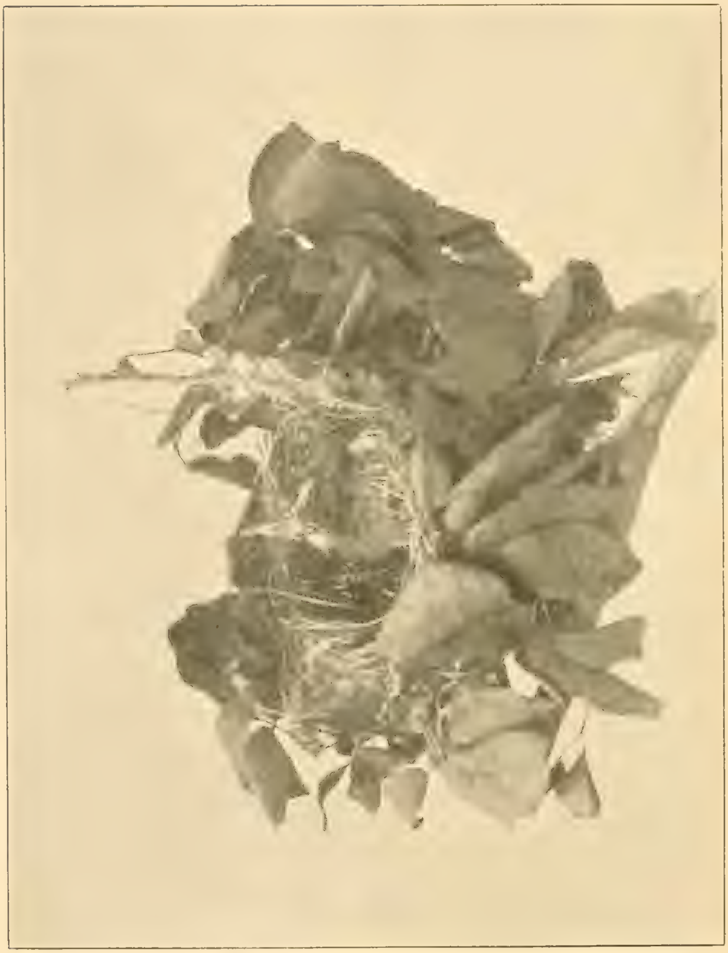

FIG. 5. MYZOMELA RUBRATRA (LESS.).

ite resorts, where they can always be seen feeding among the blossoms, doubtless attracted by the insects as well as by the honey and pollen. Their stomachs were filled with insects, many also containing traces of the coconut honey and pollen. Their size, color and actions remind one very much of the Apapane (*Himatione sanguinea*) of Hawaii. They have a sweet little song of some eight or ten notes, usually to be heard about sunrise. A series of twenty-one specimens was secured, also a number of nests and eggs. The adult female of this bird is well described by Mr. Hartert in Nov. Zool., V., p. 55, but in *Id.*, VI., he makes the statement, "The adult female differs from the male only in the smaller size," which is probably an error, as No. 9551 (Bishop Museum), a sexually adult female, as shown by the organs (See carcass No. 1502), is much lighter in color, as well as smaller in size. However, they may breed before they are fully adult. The juvenile males are usually darker than the adult females. Six specimens selected at random give the following measurements:—

| *Museum No.* | *Date.* | *Length.* | *Wing.* | *Tail.* | *Tarsus.* | *Culmen.* | *Mid-toe and c.* | *Sex.* |
|---|---|---|---|---|---|---|---|---|
| 9451 | May 24 | 5.00 | 2.50 | 1.68 | .70 | .64 | .62 | ♀ |
| 9459 | May 28 | 5.50 | 2.75 | 2.00 | .80 | .64 | .70 | im. ♂ |
| 9456 | June 5 | 5.75 | 2.90 | 2.12 | .84 | .68 | .70 | ♂ |
| 9457 | June 7 | 5.50 | 2.88 | 2.06 | .86 | .68 | .75 | ♂ |
| 9461 | June 27 | 5.50 | 2.75 | 2.00 | .81 | .68 | .70 | im. ♂ |
| 9467 | July 19 | 5.00 | 2.75 | 1.80 | .78 | .62 | .70 | ♀ |

The adult male has the head, neck, breast, back, rump, upper tail coverts, sides and the anterior part of the belly scarlet; wings, wing coverts, tail, under tail coverts, lower belly, flanks, thighs, shoulders and under wing coverts blackish brown; lores dusky. The under coloring of the feathers is dark gray, almost black where it meets the scarlet outer tip of the feather; feet and tarsus dark; eye dark hazel. The sexually adult female has the shoulders, wings, tail, belly, sides and thighs olive brown. The scarlet coloring on the remainder of the body, head and neck is not so bright or so thick as in the adult male. They are smaller in size than the adult males. The immature males are very much like the females, but are usually a little darker in color and larger in size. The young, Nos. 9466 and 9467, are olive brown above, yellowish on under parts, washed with red on the sides of the fore breast and back; bill dark, yellowish on the base of lower mandible; feet and iris dark.

The nests were neat little cup-like structures of small rootlets, fibre of plants, and wild cotton. (Fig. 5.) The internal size, 2 × 1.95 and 1.25 deep; external, 2 × 3 and 2 deep. They were usually placed among the outer branches of the wild orange, or Kamancheti trees, eight to fifteen feet from the ground. There are usually two eggs in each nest. These eggs are white, marked with brownish dots and splotches which are especially thick on the larger end of the egg. Size .75 × .57. *Hab.* Caroline Islands, Pelew and Marianas Islands.

## GENUS **ZOSTEROPS** VIGORS & HORSFIELD.

**a**$^1$. General color above a dull yellowish olive, length 3.8. *Zosterops semperi.*

**a**$^2$. General color above olive green, length 4.25. *Zosterops conspicillata.*

### 56. **Zosterops semperi** Hartl. & Finsch. **Zosterops.**

General color above dull yellowish olive, scarcely brighter on the rump and upper tail coverts; crown like the back; in front of eye a dusky spot, and below the eye a line of dusky. Length 3.8, wing 2.2, culmen .45, tail 1.33, tarsus .7. *Hab.* Pelew Islands, east and central Carolines. Rota, according to Oustalet.

### 57. **Zosterops conspicillata** Gray. **Nossac.**

*Dicæum conspicillatum*, Kittl., Kupf. Voy., 1832, Pl. 19, Fig 1.
*Zosterops conspicillata*, Gray, Gen. B. I., 1848, p. 198; Gray, Cat. B. Trop. Isl. Pacific O., 1859, p. 16; Gadow, Cat. B. Brit. Mus., 1884, IX., p. 183.

The little Nossacs are one of the common species of birds on Guam. They seem to be of a social nature and are usually seen in flocks of from ten to twenty. Their favorite feeding grounds seem to be the small Lemonceti bushes (*Linovia trifoliata*) that grow by the roadside, and in fact in the waste places all over the island. They hop about on the branches, first on one side and then on the other, keenly on the lookout for insects, which form the principal part of their food. In habits and flight they remind one very much of the goldfinch, but their note, sounded usually as they fly, is something like that of the English sparrow, but not so loud or unpleasant. Twelve specimens were taken, all but one of which were females. One nestling and three nests and eggs were secured. The measurements of half the specimens, selected at random, are given below:—

| *Museum No.* | *Date.* | *Length.* | *Wing.* | *Tail.* | *Tarsus.* | *Culmen.* | *Mid-toe and c.* | *Sex.* |
|---|---|---|---|---|---|---|---|---|
| 9566 | May 24 | 4.50 | 2.19 | 1.52 | .81 | .44 | .62 | ♀ |
| 9571 | June 7 | 4.25 | 2.16 | 1.56 | .80 | .47 | .58 | ♀ |
| 9570 | June 1 | 4.25 | 2.30 | 1.50 | .98 | .47 | .58 | ♂ |
| 9574 | June 28 | 4.21 | 2.12 | 1.50 | .78 | .48 | .59 | ♀ |
| 9575 | June 19 | 4.25 | 2.15 | 1.50 | .80 | .44 | .62 | ♀ |
| 9576 | July 21 | 3.00 | 1.50 | .56 | .80 | .35 | .62 | juv.— |

The spread of wing is about 6.75, and the depth of the bill at nostrils is about .13. The general color above is olive green varying to dull grayish olive, as in No. 9567; eyes with a ring of white, bordered below by a narrow dusky line which merges into the brownish gray of the hind cheeks and ear coverts; there is also a line of white extending from this eye ring to the base and around the upper mandible; throat and fore neck yellowish white, becoming a brighter yellowish on the breast and belly; hind cheeks, ear coverts and sides of neck grayish, with a slight shade of olive

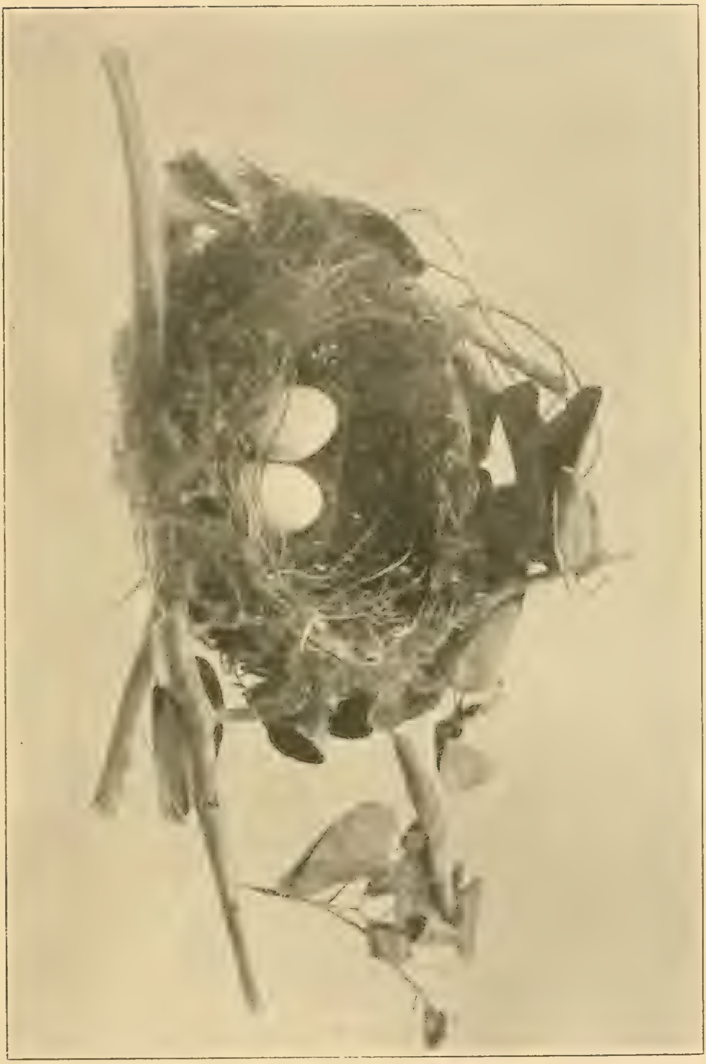

FIG. 6. ZOSTEROPS CONSPICILLATA, GRAY.

green; sides of body yellowish, with a tint of olive green; under tail coverts ranging from bright yellow to buffy; wing coverts uniform with the coloring of the mantle; under wing coverts and edge of inner webs of secondaries white; primaries brown, with the edge of outer webs olive green, except in the first primary, which is a dark brown; tail feathers olive green above, grayish below; upper tail coverts a shade brighter olive green than the mantle. The under color of the feathers all over the body is gray, so the shade of coloring on the bird depends largely upon how much of the outer tips of the feathers is worn off; bill is dusky above, light below; eye a light hazel; feet are grayish with a very slight tint of greenish. Length 4.21–4.50, wing 2.12–2.30, tail 1.50–1.56, tarsus .78–.81, culmen .44–.48, mid-toe and claw .58–.62, the depth of the bill at nostrils is about .12, and the spread of wings is about 6.50. The immature, No. 9576, just able to fly, with beak still soft, and total length of body but three inches, has the coloring uniform with the adult. The bill, however, is yellowish, and the feet and tarsi are a raw umber tint, the eyes are light hazel. The coloring of the belly is even a shade brighter yellow than in the adult. The nestlings, not yet able to fly, show the olive green coloring on the back, and buffy on the under parts; quills bluish; bill and feet yellowish.

The nests are beautiful little structures, usually built in the Ingadulus tree and well hidden among the leaves. Its size internally is 1.90×1.65 and 1 in depth, while externally it is 2.95×2.19 and 1.75 in depth. It is constructed of fine fibres and grass, the outside being covered with green moss, which renders it almost indistinguishable from below. The nest is usually placed far out where several branches come together some distance from the ground. The eggs (Fig. 6), of which there are usually two in each nest, are white with a slight tint of blue, and shaped like the eggs of a robin, measuring about .63×.50. *Hab.* Guam.

## GENUS **CLEPTORNIS** OUSTALET.

### 58. **Cleptornis marchei** Oust. **Yellow Honey-eater.**

General color a deep golden yellow; back, rump, wings and tail olive yellow. Length of wing, as given by Hartert (Nov. Zool., V., p. 56), 76–80 mm.; bill ochraceous; iris burnt umber; feet and legs orange ochraceous. *Hab.* Island of Saipan, Marianas.

## PART II.—FISHES.

FISH forms a very important part of the food of the people of Guam. There are no fish markets, however, the entire catch being divided up among those who take part in the fishing. The natives have quite a large number of pens, traps and nets. Several large seines of moderate mesh were seen in use. But the favorite way of fishing seemed to be with the small circular net, which is thrown by the fisherman as he walks along the beach.

It is recorded[1] that in former times "the natives caught and dried great quantities of fish," a grand fishing fiesta being held at certain seasons of the year. The method employed on these occasions being the poisoning of the fishes by using the juice of a native tree (*Barringtonia speciosa*). The Spanish authorities, however, finding that this was depleting the waters, by killing young as well as old, abolished this method in 1894. When the Americans took possession the law was considered obsolete. By chance I was present at the first of these fishing fiestas that had taken place for seven years. Fully seven hundred people took part in the fishing. An immense deep pool, several hundred feet across, a short distance inside the reef, was surrounded by a line of seines. At low tide about one barrel of this poisonous juice was poured into the pool. The effect was almost instantaneous; hundreds of fishes came gasping and struggling to the top of the water where they were captured and killed by the natives. No ill effect seemed to follow the eating of these poisoned fish. Thousands of small fishes were killed, and it is to be hoped our Government will put a stop to this wholesale destruction of fishes.

In the arrangement and measurement of species in the following paper I have followed Jordan & Evermann, in their work on "The Fishes of North and Middle America." I wish to express my obligations to Prof. Wm. T. Brigham, Director of the Bernice Pauahi Bishop Museum, for many valuable suggestions and kindly assistance. Many thanks are also due Dr. David Starr Jordan for looking over and supplying corrections to my MS.

[1] Government Archives, Guam.

## FAMILY **OPHICHTHYDIDÆ**.—SNAKE EELS.

### GENUS **OPHICTHUS** THUNBERG & AHL.

### 43. **Ophicthus colubrinus** (Ahl).

Head 9 into distance from snout to vent; cleft of mouth of median width; lips fringed. Teeth in jaws and on vomer obtuse, with rounded crowns, in 2 rows; dorsal fin commencing in front of gill openings; pectorals rudimentary. Color in spirits: Grayish, with about 35 brownish rings over back and sides; the older specimens have round spots in the interspaces between the rings, or the rings may become more or less broken up into roundish spots. Two specimens 6–13 inches. Guam, June 2, 1900. *Hab.* Red Sea, Andaman to Malay Archipelago, Marianas.

## FAMILY **MURÆNIDÆ**.—MORAYS.

### GENUS **MURÆNA** (ARTEDI) LINNÆUS.

### 44. **Muræna nigra** Day.

Head about 4.50 into the distance from tip of snout to anal opening. Body elongate; the trunk and tail of about equal length; Teeth biserial; mandible with about 20 teeth on each side; dorsal and anal moderately developed. Color in spirits: Uniform black, no light edge to fins. One specimen in poor condition. Length 8.50 inches. Guam, July 14, 1900. *Hab.* Andamans, Western Pacific, Marianas.

### 45. **Muræna tile** Ham.

*Young:* Head about 6 times from tip of snout to anal opening; the tail and trunk of about equal length. Body elongate. Teeth pointed; eye 2 into snout. Color in spirits: Brownish yellow, slightly lighter below. Two specimens. Length about 4 inches. Guam, June 2, 1900. *Hab.* Seas of Bengal to Malay Archipelago, Marianas.

### GENUS **ECHIDNA** FORSTER.

### 46-48. **Echidna uniformis** sp. nov.

Head, from gill openings to tip of snout, 3.20 into length anterior of vent; snout 5.20 into head. Body elongate, cylindrical; branchial openings small; tail much longer than trunk; nostrils lateral. Teeth blunt, in double rows in jaws and on the palate; dorsal beginning about the length of head posterior of the gill openings; the anal beginning just posterior of vent. Color in life: A uniform yellowish white, with a slight tint of pea green. Specimens fade but little in spirits. Three specimens. Length 6–8 inches. Guam, June 2, 1900. *Hab.* Guam. No. 47, B. P. B. M., is the type of species.

## FAMILY **ELOPIDÆ.**—TARPONS.

### GENUS **MEGALOPS** LACÉPÈDE.

### 49. **Megalops cyprinoides** (Brouss).

Head 3.66; depth 4.50; eye 3; interorbital 5; maxillary 1.66, equal in length to mandibles; D. 11 18; A. 11 22; P. 15; scales 5-35-5, maxillary extending to posterior of eye; branchiostegals 25; tubes of lateral line branched. Body oblong and compressed; mouth oblique, lower jaw prominent; a thin plate of bone attached to symphysis of the mandible of lower jaw and extending back between rami. Teeth villiform in jaws, on tongue, vomer, palatine and pterygoid bones. Fins: One dorsal fin with the posterior ray greatly elongate—greater than length of head; the dorsal situated above the ventrals, which are abdominal; base of dorsal 1.50 into base of anal; caudal well forked; pectorals very low, their length 1.33 into head. Color in spirits: Silvery, darker above, with slight wash of bluish green; margins of fins more or less dusky. One specimen. Length 8 inches. Guam, July 14, 1900. *Hab.* China, Polynesia, Seas of India, Ceylon, Marianas.

## FAMILY **SYNODONTIDÆ.**—LIZARD-FISHES.

### GENUS **SYNODUS** (GRONOW) BLOCH & SCHNEIDER.

### 50. **Synodus variegatus** (Quoy & Gaim.)

Head 3.50; depth 5.50; eye 7; interorbital about equal to eye; mandible 1.33 into head; snout 4; D. 12; A. 9; scales about 65 in lateral line. A small adipose fin without rays. Body subcylindrical, slightly elongate; interorbital space concave; gill openings very wide. Teeth sharp, directed back, numerous in jaws, tongue, palatine—those on palatine in a single row. Fins: Caudal, forked; dorsal fin slightly longer than high; tip of ventrals on a line with posterior base of dorsal; pectorals very short, 2.50 into head; the series of scales on the tail are not keeled. Color in spirits: Grayish above, white below; about 10 wide greenish bands over the back down on sides to below the axis; vertical fins with brown dots forming streaks; head more or less mottled with greenish, with 3 or 4 greenish splotches along sides of jaws, and 3 spots on under rami of jaws. One specimen. Length 5 inches. Guam, July 13, 1900. *Hab.* Indian and Pacific oceans, Marianas.

## FAMILY **ESOCIDÆ.**—NEEDLE-FISHES.

### GENUS **TYLOSURUS** COCCO.

### 51. **Tylosurus annulatus** Cuv. & Val. **Gar-fishes.**

Head 2.50; D. 23; A. 21; V. 6; eye 2 into postorbital length of head. Teeth rather strong, none on the vomer; scales thin and small; lateral line forming a keel along the free portion of tail. Color in spirits: Back and upper part of head green, with slight wash of steel blue; sides and belly silvery white; dorsal dusky; caudal with a dusky centre; remaining fins whitish; pectorals with an indistinct blotch at base. One specimen. Length 14 inches. Guam, July 14, 1900. *Hab.* Red Sea, Seas of India, Malay Archipelago, China, Marianas, North Australia.

## FAMILY **HEMIRAMPHIDÆ.**—BALAOS.

### GENUS **HEMIRAMPHUS** CUVIER.

### 52. **Hemiramphus limbatus** Cuv. & Val.

Head 3 or a little less; depth 3.50 into head; eye 4.50; snout 3.50; D. 14; A. 12; scales 54. Teeth minute and in several rows in both jaws; upper jaw short, wider than long. Fins: Caudal, lobed; the lower lobe the longest; dorsal beginning slightly in advance of anal; ventrals equal to orbit; pectorals 3 into head. Color in spirits: Silvery, bluish above; a distinct silvery band which posteriorly is equal to one scale; tip of dorsal and anal dusky. Five specimens. Length 7–10 inches. Guam, June 14, 1900. *Hab.* Seas of India, China, Western Pacific, Marianas.

## FAMILY **FISTULARIIDÆ.**—CORNET-FISHES.

### GENUS **FISTULARIA** LINNÆUS.

### 53-55. **Fistularia depressa** Linn. **Trumpet-fish. Bagag.**

Head 2.66; depth 3.20; eye 11; interorbital 14.5; D. 15; A. 14; no scales, body nearly smooth; the upper lateral edges of snout sharply serrated; the 2 middle ridges on upper surface of snout well separated, being nearest together mesially. Color in spirits: Dirty brownish, lighter below; the young with a few scattered blue spots. Four specimens. Length 8–29 inches. Guam, June 14, 1900. *Hab.* East Indies, Australia, China, Panama, Lower California, Hawaiian Islands, Marianas.

## Family **PRISTOPOMATIDÆ.**

### Genus **SCOLOPSIS** Cuvier & Valenciennes.

### **56-59. Scolopsis lineatus**[2] Quoy & Gaim. **Sihig.**

Head 3.20; depth 3; eye 3; snout 3.20; mandible equal to eye; interorbital 3; D. X 9; A. III 7; P. 16; V. I 5. Scales 3-44-12. Teeth minute, no canines. Inferior orbital with a spine directed backwards under the pupil—usually 2 or 3 smaller spines below it. Posterior margins of the opercles toothed. Body oblong, slightly compressed. Branchiostegals 5. Pseudobranchiæ developed. Gill-rakers short and blunt, 8 on lower limb. Fins: Caudal forked, the upper lobe the longest. Ventrals and pectorals of about equal length, 1.20 into head. Base of anal 3.50 into base of dorsal. About 14 rows of scales in front of dorsal fin. Color in spirits: Grayish above (in life the upper coloring is greenish), whitish below the axis. A more or less indistinct white line from snout to first dorsal spine. Two distinct white lines from above the orbit to sixth and seventh rays of soft dorsal. A third white line wider anteriorly, and more or less broken, extends from upper third of eye to just posterior of the hind margin of the dorsal fin. A fourth line forms the lower boundary to the gray coloring along the median line from eye to caudal. The upper half of pectorals has a dusky blotch, and there may be a dusky blotch, in some specimens, on the sides half way between the axis of body and the belly. Fins: All yellowish white, the spines with a bluish wash; no dark spot between first and third dorsal spines. Four specimens. Length 6–7.50 inches. Guam, June 14, 1900. *Hab.* Andamans, Malay Archipelago, Marianas.

## Family **MUGILIDÆ.**—Mullets.

### Genus **MUGIL** (Artedi) Linnæus.

### **60. Mugil waigiensis** Quoy & Gaim.

Head 4; depth 4.50; eye 4.20; 1 into snout; interorbital 1.66; D. IV, 7; A. III 8; P. 14; V. I 5. Scales 28. No adipose eyelid. Width of mouth is 2.66 Lips rather narrow, the upper lip one-half width of pupil. Body oblong, compressed, and covered with large scales. There are 16 series of scales between tip of snout and first dorsal spine. No lateral line. No true teeth in jaws. Fins: Caudal slightly emarginate. Pectorals equal to distance from posterior of head to anterior nostril. In the specimen before me the pectorals do not reach quite to the vertical of the origin of dorsal, but to the vertical of the next anterior row of scales. Ventrals and soft dorsal about equal in length, 1.50 into head. Spinous dorsal

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[2] I have carefully compared this fish with Quoy & Gaimard's description and figure (Quoy & Gaim. Voy. Freyc. Poiss., p. 322, pl. 60, fig. 3) and am convinced the species should stand as *S. lineatus*, Quoy & Gaim.

1.66 into head. Color in spirits: Silvery, with slight yellowish wash, slightly darker above. Pectorals dusky, with their lower margin yellowish. Anterior of anal dusky. Caudal, dorsals and ventrals yellowish white; iris yellow. One specimen. Length 13 inches. Guam, June 14, 1900. *Hab.* Red Sea, Indian Ocean, Polynesia, Marianas.

### 61. **Mugil axillaris** Bleek.

Head 3.50; depth 3.66; eye 3.50; interorbital 2.50; D. IV, 8; A. III 9. Scales 44. No adipose eyelid. No teeth in jaws. Pectorals reach to vertical base of dorsal, the tip of pectorals being on the 13 series of scales from the back of the head. The preorbital is indistinctly denticulate. Maxillary hidden. Snout shorter than orbit. Twenty-one series of scales between tip of snout and origin of dorsal. Caudal is slightly emarginate. Dorsal fins are of about equal length, the first dorsal spine is equal distance between tip of snout and base of caudal. Pectorals are equal in length to the distance from posterior edge of opercle to anterior nostril. An elongated scale in axis of pectorals. The origin of soft dorsal is very little behind origin of anal. Color in spirits: Silvery, with bluish wash, deeper blue on back. Ventrals white. Pectorals, dorsals, anal and caudal fins slightly dusky. One specimen. Length 3 inches. Guam, July 12, 1900. *Hab.* East Indian Archipelago, Marianas, Samoa.

### 62-64. **Mugil planiceps** Cuv. & Val. **Agoas.**

Head 4; depth 4; eye with adipose lid developed on fore and back of eye, but not extending on pupil. The clear part of eye 4.66 into head; interorbital 2.20. Scales 36; 19 series of scales from snout to first dorsal spine; D. IV, 18; A. III 9. There are 20 series of scales between origin of dorsal and tip of snout. The anterior margin of spinous dorsal is exactly midway between tip of snout and base of caudal fin. A lance-like scale above axes of pectorals. Lips thin. The pectoral fin barely reaches the vertical of base of dorsal, ending on the eighth scale of a lateral series. The soft dorsal has its origin above the third soft anal ray. Caudal rather deeply emarginate. Color in spirits: Silvery, with wash of yellowish, slightly darker above; more or less golden reflection behind eye. Pectorals white, the former with an indistinct dusky blotch at base. Caudal, dorsals and anal with more or less indistinct dusky wash. Three specimens. Length 3–6 inches. Guam, May 26, 1900. *Hab.* Coasts of Ceylon, Bengal, Hindostan, China, Marianas.

## GENUS **SPHYRÆNA** (ARTEDI) BLOCH & SCHNEIDER.

### 65. **Sphyræna obtusata** Cuv. & Val.

Head 3; depth 8.50; eye 5.33: maxillæ 2.30; mandible 1.50; interorbital equal to eye; snout 2.20 into head; D. V, 19; A. 18. Scales 92, extending over opercles and cheeks. Body rather elongate, sub-cylindrical. Gape of mouth deep, the lower jaw the longest. Teeth sharp-pointed in jaws and palatines, none on vomer. Fins: Interspaces between the two dorsal fins equal to one-half length of head. Caudal forked. Ventrals equal to distance from hind margin of opercle to eye. Color in spirits: Grayish green above, yellowish white below. The gray descends in a festooned edge along the lateral line, giving the appearance of about 12 dusky splotches along the sides—this is more distinct in young. The young also show indistinct dusky bands over the back. Three specimens. Length 3–5.50 inches. Guam, July, 1900. *Hab.* Seas of India to Malay Archipelago, Marianas.

## FAMILY **POLYNEMEDÆ.**—THREAD-FISHES.

### GENUS **POLYDACTYLUS** LACÉPÈDE.

### 66. **Polydactylus sexfilis** Cuv. & Val. **Bocadulce.**

Head 3.5; depth 3.45; eye 4.50, more or less covered by adipose membrane; interorbital 3.66; premaxillary 2.20; mandible 2.20; D. VIII, I 2; A. III 12; P. 14; V. I 5. Scales 46; lateral line continuous; 5 free articulated appendages below each pectoral fin; two separate dorsal fins. Body oblong, compressed. Muciferous system of head well developed. End of snout projecting beyond the mouth. Teeth setiform, several bands on premaxillary, vomer and palatines. Vertical margin of the preopercle strongly denticulate. Fins: Caudal deeply forked, the longest ray one-third longer than head. Short middle ray 2.50 into head. Pectoral 1.20 into head. Longest ray of soft dorsal equal to head. Color in spirits: Silvery white, slightly darker above, a dusky splotch at base of caudal. Pectorals and anals dusky. Tips of dorsals dusky. One specimen. Length 13.5 inches. Guam, June 28, 1900. *Hab.* Seas of India, Polynesia, Marianas.

## FAMILY **HOLOCENTRIDÆ.**—SQUIRREL-FISHES.

### GENUS **MYRIPRISTIS** CUVIER.

### 67-68. **Myripristis murdjan** (Forsk). **Sagamolang.**

Head 3; depth 2.50; eye 2.20; snout 2 into eye; interorbital equal to snout; D. X, I 14; A. IV 12; P. 15; V. I 7. Scales 3-34-6. Body oblong, slightly elevated and compressed. Teeth villiform. Mouth oblique, lower jaw projecting, with a rough nipple-like projection on each side of symphysis. Maxillary reaches to beneath last third of orbit. Preopercle serrated its whole extent. Opercle with moderately strong spine, all the posterior margin below the spine and a little way above it finely serrated. Upper surface of head roughened by about four raised lines which branch posteriorly and end in small spines. Color in life: Roseate, gill openings and axillæ of pectorals black. Fins whitish, except a dusky blotch on tip of soft dorsal. Three specimens. Length 2–7 inches. Agaña, Guam, June 14, 1900. *Hab.* Red Sea, east coast of Africa, Seas of India to Malay Archipelago, Marianas, Hawaiian Islands.

## GENUS **HOLOCENTRUS** (GRONOW) SCOPOLI.

### 69. **Holocentrus diadema** Lacép.

Head 3.20; depth 3; eye 2.50; interorbital equal to snout, 4.20 into head. Maxillary 3 into head and reaching to a line beneath the anterior margin of pupil. The upper processes of intermaxillaries end scarcely posterior of anterior margin of eye. D. XI 13; A. IV 9; P. 15; V. I 7. Scales 3-48-8; a single vertical row of 9 scales on the opercle. Orbital, opercular and preopercular bones serrated. The preorbitals have a large spine anteriorly; two opercular spines, the upper of which is much the stronger. The preopercular spine is 2.66 into vertical margin of preopercle and 2 into eye. Fins: Caudal well forked; the third, fourth and fifth dorsal spines the longest, about equal to longest ray of soft dorsal; third spine of anal much the longest, 1.20 into head, about equal in length to ventral fin. The scales on the sides of anal fin are much elongated and serrated. Color in life: Red, with lighter longitudinal lines. Color in spirits: Silvery grayish, darker above, with about 10 lighter longitudinal lines. Dorsal fin black, with a white longitudinal line through the middle, also an indication of light coloring on margin of fin. The web between third and fourth anal spine is black, otherwise all the fins are uniform yellowish white. Three specimens. Length 2.50–5.50 inches. Guam, July 28, 1900. *Hab.* Red Sea, Ceylon, Chinese Sea, Indian Archipelago, Marianas.

### 70. **Holocentrus operculare** Cuv. & Val.

*Young:* Head 3.20; depth 3; eye 2.50; maxillary equal to eye; interorbital 3.50 into head; D. XI 13; A. IV 10. Scales 37. Opercles and preopercles serrated, the preopercle spine equal to diameter of eye, and much smaller than the two spines of the opercles. Color, red; in spirits, a silvery grayish, slightly darker above. All the fins yellowish white, except the spinous dorsal which is black with white lines between the spines. One specimen, very young. Length 2 inches. Guam, July 23, 1900. *Hab.* Sea of New Ireland, Banda, Marianas.

### 71. **Holocentrus binolatum** Quoy & Gaim. **Cholog.**

Head 3; depth 2.66; eye 2.50; snout about equal to interorbital; D. XI 14; A. IV 9; P. 14; V. I 7. Scales 4-46-8. Opercles, preopercles, and orbitals with posterior and lower margins serrated. Maxillary reaching the posterior margin of pupil 2.20 into head. Mandible 1.66 into head. Preopercular spine long and strong, about twice as long as the two opercular spines. Preorbital with a strong spine anteriorly, and another not quite so strong under the anterior third of pupil. Fins: The third, fourth and fifth dorsal spines are longest, but are only two-thirds as long as third anal spine, and are rather shorter than the soft dorsal. Caudal well forked, the lobes equal. Pectorals slightly longer than ventrals, 1.25 into head. Color in spirits: Silvery whitish, with wash of yellowish. About 12 indistinctly darker stripes on body. Fins yellowish white, with a slightly darker splotch between the two anterior spines at base. The original description of this fish gives the dorsal fin as XI 14, and the figure in Voy. Astrol. Poiss., Pl. 14, Fig. 4, gives the stripes on the body, especially on lower half, as darker red than the ground color, which is very true of the specimen before me. One specimen. Length 5.50 inches. Guam, July 14, 1900. *Hab.* New Guinea, Guam, Marianas.

### 72. **Holocentrus unipunctatum** Gunth. **Lesiog.**

Head 2.66; depth 2.50; eye 3; interorbital 2 into eye; snout 3.20; maxillary 2.50; D. XI, 15; A. IV 10; P. 14; V. I 7. Scales 3-45-8. Opercles, preopercles and orbitals serrated. The preopercle spine, measured from scales, 1.66 into vertical limb of the preopercle, and about equal to eye; the two opercular spines of equal size and less than one-half the length of preopercular spine. Fins: The third, fourth and fifth dorsal spines the longest. Ventrals and pectorals of about equal length. Caudal well forked, lobes equal, the third anal spine the longest—2.66 into head. Color in life: Red, with about 12 slightly darker red lines. In spirits the fish becomes a dull grayish white, with very indistinct darker lines, the fins being a uniform yellowish white, except a small blotch of black between the first and second dorsal spines, near the base. One specimen. Length 5 inches. Guam, June 14, 1900. *Hab.* Polynesia, Marianas.

### 73-74. **Holocentrus fuscostriatus** sp. nov. **Chalak.**

Head 3; depth 3.50; eye 2.66; interorbital 4; snout 3.50; maxillary equal to distance from posterior of orbit to posterior edge of opercle; mandible 1.66; lower jaw projecting; D. X, I 12; A. IV 8; V. I 7; P. 14; C. 18, with 6 spines on each side. Scales 3-40-8; about 27 scales on preopercle, each scale with a brown spot at base. Posterior margins of opercles and preopercles denticulate, except the oblique lower half of sub-opercle. The opercle has a single vertical row of 8 scales on its anterior margin. Opercle with two spines from posterior margin, their exposed length 2 into pupil, a minute spine just above these two; lower margin of interopercle finely toothed; lower angle of preopercle with flat spine, its exposed length from scales 2 into orbit, 2.50 into horizontal length of preopercle. Preorbitals and sub-orbitals strongly denticulate. Mouth protracted.

Groove for the posterior processes of the intermaxillaries reaches to a line with the anterior margin of the pupil. No spine on snout. Teeth: Bands of villiform teeth on jaws, vomer and palatines. On top of head just posterior of eyes about 8 raised lines form a fan-shaped area on each side. Fins: The second dorsal spine is the longest, equal to distance from base of anterior dorsal spine to base of sixth dorsal spine. The first dorsal spine 2 into head, the last 2.50 into orbit. Third anal spine the longest, 1.33 into head. Soft dorsal and pectorals of about equal length, 1.66 into head. Ventrals 1.50 into head. Color in life: General color silvery, slightly darker above, with a wash of purplish red and gold, the scales with a splendid opalescent reflection, each side with 10 very distinct dusky lines which have a wash of purple madder. The lateral line, which is slightly the widest, is a brighter red with less of dusky. Top of head deep red. Spinous dorsal reddish with a big black splotch between the 4 anterior spines. A row of triangular white spots between the spines near base, and a marginal line of white. Soft dorsal yellow, with the two anterior rays red. Four outer rays on each margin of caudal red, the inner part yellow. Anal yellow, the fourth spine and first ray red. Pectorals pinkish. Belly and ventral fin white. Twenty-five specimens. Length 2–7 inches. Guam, July, 1900. The young are similar in color, with the lines not quite so distinct, and with two dusky blotches over each eye. Type specimen No. 73, B. P. B. M. *Hab.* Marianas.

### 75-76. **Holocentrus microstoma**[3] Gunth.

Head 3.20; depth 3.50; eye 2.66; snout one-third less than eye; maxillary equal to eye; mandible 2 into head; D. XI I 10; A. IV 9; P. 16; V. I 8. Scales 3-54-8; 8 series of scales in front of dorsal. Preopercles scaled. Opercle with a single vertical row of 8 scales which are deeply toothed posteriorly. Gill-rakers moderate, 12 including rudiments on lower limb. Hind margins of all the opercles, preopercles, the post, sub and preorbitals strongly serrated on their posterior or lower margins. Lower edge of preopercle with a prominent spine, the free portion from the scales measuring 2.20 into vertical limb of the preopercle, from lower margin of spine. Two prominent opercular spines, the upper much the largest. A prominent spine at the anterior end of preorbitals. Mouth projectile, lower mandible slightly the longest. Grooves for the posterior processes of the intermaxillaries ends anterior of a line with front of pupil. The turbinal bones end in prominent processes. Teeth villiform. Fins: Caudal well forked, with six small spines at base of each margin. Third anal spine the longest, equal to depth of the fish. Fourth and fifth dorsal spines the longest, 155 into head; the first dorsal spine is about equal to eye, and the last is equal to pupil. Pectorals 1.50 into head. Anterior rays of the soft dorsal are the longest, being equal in length to the fourth dorsal spine; the anterior rays of soft anal are also the longest, being equal to length of pectorals. Color in life: Red, with about 12 whitish longitudinal lines, most distinct on upper surface. Color in spirits: Silvery gray, with lighter longitudinal lines; fins all uniform yellowish white, except spinous dorsal, which has a rather narrow white margin and an intermarginal line of black, below which is another line of white. Two specimens. Guam, July 14, 1900. *Hab.* Polynesia, Marianas.

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[3] Specimens from Guam show that *H. binolatum* and *H. microstoma* are distinct species.

## FAMILY **MULLIDÆ**.—SURMULLETS.

### GENUS **MULLOIDES** BLEEKER.

### 77. **Mulloides flavolineatus** Lacép. **Salmoneti.**

Head 3.50; depth 4; eye 4; interorbital 3.50; width of maxillary at end 1.66 into eye; D. VII, 9; A. II 6. Scales 2-37-6. Body oblong, slightly compressed. Villiform teeth in both jaws, no teeth on vomer or palatines. Interorbital space flat. Barbules thick, reaching to angle of preopercle. Opercular spine small. Fins: Pectorals 1.50 into head. The longest dorsal spine 1.30 into head; the longest dorsal ray 2.20, equal in length to longest anal ray; 5 rows of scales between the two dorsal fins. Color in spirits: Back dusky, with slight wash of reddish; sides and belly with wash of yellowish, and indication of a yellowish line along sides. One specimen, length 11.5 inches; 14 young, length 3 inches. In some of these young the yellow band from head to caudal shows very distinctly. Guam, June 2, 1900. *Hab.* Red Sea, through India to Malay Archipelago and beyond, Marianas.

### 78. **Mulloides samoensis** Gunth.

Head 3.50; depth 3.50; eye 3; interorbital 3.66; mandible 3.50 into head; D. VII, 9; A. II 6. Scales 2-40-7. Villiform teeth in jaws in several series, no teeth on vomer or palatines. Fins: Pectorals 1.50 into head, equal in length to the longest dorsal spine. Longest dorsal ray 2 into head. Ventrals 1.30 into head. Barbules reaching to angle of preopercle. Color in spirits: Silvery white, a bluish wash above, a small dusky splotch on sides just below the ninth and tenth scale of the lateral line—the tips of the pectoral fins reach to the centre of this spot. An indistinct dusky blotch on interorbital region. One specimen. Length 4.50 inches (color much faded). Guam, June 2, 1900. *Hab.* Samoa, Marianas.

### GENUS **UPENEUS** CUVIER.

### 79. **Upeneus multifasciatus** Quoy & Gaim.

Head 3.20; depth 3.20; eye 5.50; interorbital 3.50; maxillary 2.20, its width at end greater than eye; D. IX, 9; A. 7. Scales 2-30-6. Barbules long, reaching within two rows of scales from base of ventrals; two rows of scales between the two dorsal fins. Body oblong, compressed, the upper profile quite convex. Teeth in a single row in jaws, no teeth on vomer or palatines. A small opercular spine. Fins: Posterior rays of soft dorsal prolonged, 1.66 into head. Third dorsal spine the longest, 1.50 into head. The pectorals and ventrals are about equal in length. Color in spirits: Upper color brownish, with indication of purple. A brown line down snout through eye. A broad saddle of black on the caudal peduncle; another broad black band descends from the anterior half of soft dorsal. There are also indications of two or three more or less amalgamated broad black bands in front of this. Under surface yellowish white. Spinous dorsal dusky. Inner half of soft dorsal black, outer half marked with two or three longitudinal pale bluish lines. Pectorals cadmium yellow. Ventrals with external rays bluish, inner ones yellow. Anal bluish with 4 or 5 lighter longitudinal lines. Caudal dusky. One specimen. Length 8 inches. Guam, July 19, 1900. *Hab.* Seas of India, Malay Archipelago, Polynesia, Marianas.

### 80. **Upeneus saffordi**[4] sp. nov. **Salmoneti.**

Head 3; depth 3.25; eye 5.66; interorbital 4; maxillary 2.50, its width at end equal to eye. Scales 2-30-7; D. VIII, I 8; V. I 5. Barbules long, reaching to base of ventral fins. Body oblong, compressed, the upper profile quite concave. Snout rather sharp-pointed. The distance from the anterior margin of orbit to tip of snout 1.86 into head. Teeth in a single row in each jaw, no teeth on vomer or palatine. Three series of scales between the two dorsal fins. A small preopercular spine. Fins: Spinous dorsal and ventrals of about equal length, 1.25 into head. Second ray of soft dorsal 2 into head, equal in length to base of fin. Base of anal 2.50. Pectorals 1.60 into head, their base equal to shortest ray, their tip reaching to a line with the tenth scale of lateral line. Caudal well forked, the longest ray 1.25 into head. The posterior rays of the anal or dorsal are not prolonged. Color in life: Uniform cadmium yellow, with a saddle of bright yellow extending over the upper part of caudal peduncle and down to the lateral line, with two distinct bluish lines from eye, two-thirds of the distance down sides of snout. Color in spirits: Uniform yellowish white, a whitish saddle over top of caudal peduncle down to lateral line, a dusky reddish splotch covering sides of snout. Fins all uniform light chrome; iris bright yellow. The young are similarly colored, but without the yellow marking on caudal peduncle so distinct. Two specimens. Length 6.50–3.00 Agaña, Guam, July 14, 1900.

### 81. **Upeneus trifasciatus** Lacép.

Head 3.20; depth 3.20; eye 4.50; maxillary 3.66 into head. Scales 2-30-6; D. VIII, 9; A. 7; snout blunt. Teeth in a single row in jaws, none on vomer or palatines. Barbules reaching about to angle of preopercle. Fins: Spinous dorsal 1.50 into head. Longest ray of soft dorsal 2 into head. Two rows of scales between soft and spinous dorsal. Color in spirits: Scales of upper surface more or less edged with brownish, below yellowish white. A brown line from end of snout through eye to below soft dorsal fin; back of the head this brown line is accompanied on each side by a yellow line of almost equal width. A dusky saddle over free portion of tail, with a yellowish spot between it and the soft dorsal. A more or less dusky line down posterior margin of preopercle. Base of opercular spine dusky. One specimen. Length 8 inches. Guam, May 26, 1900. *Hab.* Indian Ocean, Polynesia, Marianas.

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[4] Named in honor of Lieutenant-Governor W. E. Safford, U. S. N., of Guam, in recognition of his interest and work in Polynesian natural history.

## FAMILY **CARANGIDÆ.**—POMPANOS.

### GENUS **CARANX** LACÉPÈDE.

### 82. **Caranx ascensionis** (Forst.). **Tarakita.**

Head 3.33; depth 2.66; eye 5.33, 2 into snout; interorbital 4; D. IX, I, 22; A. II, I 19; V. I 5. Scales about 58 to the beginning of the plate-like scales which arm the posterior half of the lateral line; there are 48 of the plate-like scales which begin on a line of the fifth dorsal ray. Body oblong, compressed. Mouth protractile, the lower jaw slightly the longer. Maxillary broad, almost as wide as eye. Preopercle not serrate. Branchiostegals 7. Pseudobranchiæ present. Teeth: The teeth in the upper jaw in villiform band, with an outer series of stronger ones; those of the lower in a single series; minute teeth also on palate and tongue. Fins: The dorsal consists of a recumbent spine followed by seven rather weak spines, all connected, the longest being 2.75 into head; following these and scarcely connected with them is a short strong spine about midway between the spinous dorsal proper and soft dorsal. The soft dorsal is about equal in length to anal and similar in form; the longest ray is contained 1.33 into head, being a little longer than the first ray of anal; there are no detached rays. The pectorals are long and falcate, their length greater than head, 3 into total length. Ventrals short, 2.50 into head. Caudal well forked, lobes equal, 4 into total length. The body is finely scaled, there being no bare area in front of ventrals. Lateral line strongly curved, the curved portion 1.50 into straight. Color in spirits: Silvery with a slight wash of yellowish. Pectorals yellow. Dorsal and anal bluish. The outer rays of caudal seem to have more or less yellowish wash. One specimen—length 13 inches—and 13 young 2.50–4.50 inches, were taken near the reef. Guam, July 9, 1900. The young are unstriped and have more bluish on the back, and the fins with less color. *Hab.* Gilbert Islands, Marianas.

### 83. **Caranx sexfasciatus** Quoy & Gaim.

Head 3.33; depth 2.50; eye 3.50, 1 into snout; interorbital 3.66; D. VIII, I, I 21; A. II, I 19. Scales numerous, plates 33. Lateral line strongly curved, the curve 1.66 into straight portion. Lower jaw slightly longer than upper. Breast scaly. Teeth of upper jaw form a villiform band, an outer series of larger ones also present, a single row in lower jaw, small teeth on palate. Color: Silvery, bluish above, with about seven dusky vertical bands about equal to width of eye and narrower than interspace. An indistinct opercular spot. Fins yellow. Two specimens, length 4.50 inches, were taken at Agaña, Guam, July 9, 1900. *Hab.* Western Pacific, Marianas.

## GENUS **LEIOGNATHUS** LACÉPÈDE.

### 84-86. **Leiognathus obscura** sp. nov.

Head 3.33; depth 1.66; eye 2.80, 1 into snout; interorbital 3; D. VIII, 17; A. III 15; V. I 5. Scales small, deciduous, cycloid, no scales on chest. Lateral line unarmed and but slightly curved. Body elevated and strongly compressed. Mouth protractile, upper jaw rather overhanging. Teeth minute, of equal size in jaws. Preopercle and supraorbital serrate. Two short spines on upper anterior part of orbit, the distance between two outer spines 2.50 into head. Branchiostegals 5. Pseudobranchiæ present. Gill-rakers short but wide, with many small teeth. Fins: Second dorsal spine 3.80 into length, the third dorsal spine equal in length to second anal spine, 1.50 into head. Pectorals and second dorsal spine of equal length. Ventrals small, 2 into head. Caudal well forked, lobes of equal length; caudal peduncle 4 into head. The pores of lateral line are slightly enlarged anteriorly. Color: Silvery white, bluish above. An irregular dusky splotch about the size of eye a little below the axis, above anterior anal spine. The inner bases of pectorals are black. A dusky splotch at upper edge of opercle, another at upper margin of orbit—this invades the upper part of iris, which otherwise is yellow. Snout more or less dusky with a short black line down each side from nostrils to upper lip. A dusky splotch on upper part of caudal peduncle. Fins white, a wash of yellow on caudal. Three specimens, length 3–5.50 inches, taken at Agaña, Guam, May 26, 1900. No. of type 84 B. P. B. M. *Hab.* Marianas.

# FAMILY **PEMPHERIDÆ.**

## GENUS **PEMPHERIS** CUVIER & VALENCIENNES.

### 87-90. **Pempheris otaitensis** (Cuv. & Val.). **Sapi sapi.**

Head (from bony margin of opercle to tip of snout) 4; depth 2.50; eye 2.25; maxillary 1.60; mandibles 1.50; interorbital 1.50 into eye; from anterior margin of orbit to tip of snout is one-half the diameter of eye; D. VI, 9; A. III 41; V. I 5; P. 19. Scales about

68–70 in lateral line. Mouth oblique. Setiform teeth on jaws, vomer and palatines. Snout blunt. Branchiostegals 7. Fins: Anal long, its base twice into length of fish. It is placed at an angle of about 40° to the axis. The rays are short, the longest being equal to the diameter of eye. The base of dorsal is 1.66 into head, its longest ray being about equal to head. Caudal emarginate. Pectorals about equal to length of head. Color in spirits: Silvery, with a wash of reddish, each scale having a silvery margin with a sub-marginal brownish red area of about equal extent; darker above. Axis and base of pectorals black, a darker area along base of anal. Dorsal spines and tip of anterior dorsal rays black. Caudal dusky on edges, lighter in centre. Anal, pectorals and ventrals yellowish white. A more or less distinct splotch of gold just posterior of eye on opercle. Iris yellow. Five specimens. Length 3-7 inches. Guam, July 14, 1900. *Hab.* Western Pacific, Marianas.

## FAMILY **KUHLIIDÆ.**

### GENUS **KUHLIA** GILL.

### 91-93. **Kuhlia rupestris** (Lacép.).

Head 3; depth 2.66; eye 4; maxillary 2.33, no supplemental bone; mandible 1.66; interorbital 3.50; D. X 11; A. III 10; V. I 5; P. 13. Scales large, 5-44-9, lateral line complete. Body oblong, slightly compressed. Mouth large, protractile. Teeth: Bands of villiform teeth on jaws, vomer, palatines, entopterygoid and ectopterygoid bones. Tongue smooth. Gill-rakers about 16, rather short on lower limb. Branchiostegals 6. Pseudobranchiæ well developed. Opercle with two spines. Preorbital and preopercle finely denticulate, gill membranes separate. Fins: The caudal is emarginate, the lobes rounded. Fifth dorsal spine is 2.50 into head; tenth dorsal spine is much longer than ninth, its length 3 into head. Ventrals and pectorals of about equal length. Anal longer than its distance from caudal. Color in spirits: Dark silvery, bluish above, most of the scales with a blackish spot at tip or base. Caudal, anal and dorsal dusky, with a wide whitish space at tip. Ventrals white. Pectorals whitish, upper ray black. Three fine specimens, length 6–9 inches, were presented to the Museum by Lieutenant-Governor W. E. Safford, U. S. N. These were taken in fresh water at the head of the Agaña river, Guam, 1900. This is a valued food fish. *Hab.* Fresh water streams and lakes of Polynesia, Marianas.

## FAMILY **CHEILODIPTERIDÆ.**—CARDINAL-FISHES.

### GENUS **APOGON** LACÉPÈDE.

### 94. **Apogon fasciatus** Quoy & Gaim. **Lansi.**

Head 2.86; depth 3; eye 2.50; snout 50 into eye; interorbital about equal to snout; maxillary reaching beyond pupil 1.23 into head; D. VI, I 9; A. II 8. Scales 1-28-4. Teeth villiform in jaws, vomer and palate. Body oblong, slightly compressed and elevated. Branchiostegals 7. The preopercle has a double edge, the outer one of which is serrated. Gill-rakers rather long and slender, 12 on lower limb. Fins: Caudal emarginate. Pectorals and ventrals of about equal length, 1.50 into head. The spinous and soft dorsals separate, the soft dorsal the longest. Base of anal slightly less than base of soft dorsal. Color in spirits: Yellowish white with wash of red. Four lateral longitudinal black bands on each side from head to caudal, the second and fourth lines form an arch on the base of caudal fin. A black band on base of anal, also a black band on base of soft dorsal. Other fins yellowish. Lower jaw more or less dusky. Twenty specimens. Length 1–3 inches. Guam, June 14, 1900. *Hab.* Seas of India, Malay Archipelago, Marianas.

### 95. **Apogon auritus** Cuv. & Val.

Head 2.50; depth 2.86; eye 3.50; D. VII, 9; A. II 7; interorbital 2 into eye; maxillary 2 into head. Scales 23. Teeth villiform in jaws, vomer and palatines. No canines. Bones of the head not serrated. Caudal rounded. Color in spirits: Yellowish brown, with darker spots over body. A black spot half as large as eye and margined with white on the opercle. One specimen. Length 2.25 inches. Guam, July 12, 1900. *Hab.* Red Sea, Seas of India to Malay Peninsula, Marianas.

### 96-98. **Apogon savayensis** Gunth.

Head 2.66 (without flap); depth 2.66; eye 2.55; snout 1.66 into eye; maxillary 1.66; mandible 1.50; D. VII, I 9; A. I 8. Scales 2-27-5. Body oblong, compressed. Preopercle with a double edge. Teeth villiform in jaws, vomer and palatines. Fins: Caudal slightly emarginate. Length of spinous dorsal 1.66 into head. Base of anal equal to eye. Pectorals slightly longer than the ventrals. Color in spirits: Olive, a dusky saddle over free portion of caudal peduncle. A dusky oblique line from lower posterior edge of orbit to lower posterior edge of opercle. There are slight indistinct indications of four other dusky bands descending from the dorsal fins to belly. Ventrals white. All the remaining fins more or less dusky. Seven specimens. Length 2–4.50 inches. Guam, June 14, 1900. *Hab.* Coasts of Africa, Seas of India, Marianas.

## FAMILY **SERRANIDÆ**.—SEA BASSES.

## GENUS **EPINEPHELUS** BLOCH.

### 99. **Epinephelus dæmetii** Gunth.

Head 2.66; depth 3.66; eye 4.66; width of maxillary at distal end 2.50 into eye; mandible 1.50 into head; interorbital 2 into eye; D. XI, 16; A. III, 8; V. I 5; P. 17. Scales small, about 85 in lateral line. Teeth in narrow bands in 2 series on the sides of the mandibles. Canines strong. Villiform teeth also on palatine bones and vomer. Branchiostegals 7. Pseudobranchiæ present. Maxillary reaching past vertical of posterior of eye, lower jaw projecting. Border of preopercle rounded and serrate, the serræ slightly larger at angle. Gill-rakers short, 13 on lower arm, with villiform teeth. Fins: Caudal rounded, its length about 2 into head. Soft anal slightly longer than soft dorsal. Third anal spine the longest, 2.50 into head. Fifth dorsal spine the longest, 2.66 into head. Pectorals rounded, 1.50 into head, their base about equal to orbit. Ventrals not reaching to anus. Color in spirits: Brownish, with mottlings and narrow lighter more or less hexagonal lines, white below, the body with about six indistinct slightly oblique bands about as wide as interspaces. The dorsal parts of these bands are very black and distinct, less distinct on sides; the first is on the shoulders, second from 2–5 dorsal spine, third from 7–10 dorsal spine, fourth from 2–6 dorsal ray, fifth from 12–14 dorsal, and the sixth forms a black saddle on caudal peduncle. All of these bands extend a little obliquely down to the ventral surface of body. The thorax has 9 round brown spots half as large as eye. The caudal is brown with small white spots and a narrow white margin. The pectorals a yellowish without distinct markings. Anterior of ventrals dusky, remainder of fin white with about 9 brown spots. Tip of anal black. The general coloring of both the anal and dorsal is brown with lighter lines reticulating through them. One specimen. Length 6.5 inches. Guam, July 12, 1900. This species is well figured in Boul. Cat. Fishes, 2 ed., p. 223, Pl. VII. *Hab.* Western Pacific, Marianas.

### 100-103. **Epinephelus hexagonatus** (Bl.). **Gadua.**

Head 2.66; depth 3.20; eye 5; distal width of maxillary reaches to below hind edge of orbit 2.50 into eye; mandible 1.50 into head; interorbital 1.33 into eye; D. XI 16; A. III 8; V. I 5; P. 16. Scales small ctenoid, about 108 in lateral line. Upper two-thirds of hind margin of preopercle finely serrated, lower third coarsely so. Hind margin of opercle with three spines equidistant apart, the middle one the largest, its length about 2 into orbit. Fins: The caudal is rounded, its length about 2 into head. Pectorals rounded, their length 1.66 into head, their base about equal to orbit. The soft dorsal and soft anal are about equal in length, 2.50 into head. Color in spirits: Brown, with light reticulations covering the body, giving the appearance of hexagonal, sometimes rounded, or more or less confluent spots. These spots not only cover the entire body but all the fins also. On the pectorals, however, the spots are smaller and more nearly in rows. Four specimens. Length 4–8 inches. Agaña, Guam, July 12, 1900. *Hab.* Western Pacific, Polynesia, Marianas.

## FAMILY LUTIANIDÆ.—SNAPPERS.

### GENUS LUTIANUS BLOCH.

### 104-106. Lutianus fulvus (Bl.). Kakaka.

Head with flap 2.60; depth 3; eye 3.66; interorbital less than eye; snout 3; D. X 14; A. III, 8. Scales 52, which are oblique above lateral line, horizontal below. Maxillary equal to length of snout. Interopercular knob well developed. The vertical limb of the preopercle with a deep emargination and a produced rounded angle; above the notch the limb is serrated. Branchiostegals 7. Pseudobranchiæ developed. Body oblong, compressed. Fins: Caudal fin emarginate. Length of pectorals equal to distance from posterior margin of opercle to anterior nostril. Base of anal about 4 into base of dorsal. Ventrals 1.66 into head. Color in spirits: Uniform yellowish, with slight wash of reddish. A dusky splotch in axis and on base of pectorals. The upper third of dorsal black, with a narrow white margin. Caudal more or less dusky, with a narrow white margin. An indistinct dusky mark near middle of anal. Pectorals and ventrals yellow. Three specimens. Length 6–8 inches. Guam, June, 1900. *Hab.* Andamans, Polynesia, Marianas.

### 107. Lutianus bengalensis (Block.).

Head 2.50, including opercle flap; depth 3; eye 4; interorbital 2.33 into snout; D. X 15; A. III 9; V. I 5; P. 15. Scales 64. Maxillary 2.66 into head. Vertical limb of the preopercle with a notch above its rounded angle. Interopercular knob distinct. Teeth villiform on vomer and palatines, small-sized canines in premaxillary with a row of small curved conical teeth in each jaw. Gill-rakers of moderate size, 13 on lower limb. Fins: Caudal forked. Pectorals equal to distance from tip of opercular flap to hind nostril. Ventrals about 2 into head. Base of anal 3.86 into base of dorsal. Color in spirits: Yellowish white, a slight wash of bluish above. Four blue, brown-edged stripes, one-half as wide as pupil, along sides of body; first from interorbital to eighth dorsal spine, second from upper posterior margin of orbit to 4–6 dorsal ray, third from upper anterior margin of opercle on a line with middle of orbit to behind the last dorsal ray, fourth from sides of snout below orbit across opercles to middle of caudal fin. Fins: Yellowish white. Dorsal with dusky tip. One specimen. Length 7 inches. Guam, June 14, 1900. *Hab.* Red Sea, seas of India, Malay Archipelago, Marianas.

### 108. Lutianus erythropterus Bl.

*Young:* Head 2.50; depth 2.66; eye 3.20; interorbital 6 into head; snout equal to eye; maxillary reaches to below the pupil; D. X, 13; A. III 8. Scales 55. Body oblong, compressed, and slightly elevated. Color in spirits: Yellowish white, with a slight wash of reddish brown. Fins: Yellowish white, the dorsal with a fine black margin. Twenty-seven small specimens. Length about 1 inch. Guam, June 1, 1900. *Hab.* Red Sea, coast of Africa, seas of India to Malay Archipelago, Marianas.

### 109-110. **Lutianus bonhamensis** Gunth. **Mafuti.**

Head 3; depth 3; eye 3.66; interorbital 3.18; snout 2; maxillary 2.50 into head, not reaching to orbit; mandible 2.20; D. X 9; A. III 8; P. 14; V. I 5. Scales 6-48-15. Body oblong, compressed. Brachiostegals 6. Teeth villiform in anterior portion of jaws, with 4 canines in front of them; the teeth in hind part of jaws rounded molars, 8 on each side behind the canines, the 4 anterior of these rather sharply pointed. Fins: Caudal emarginate. Pectorals about the length of head. Ventrals reaching to anal opening, 1.50 into head. Base of anal 2.66 into base of dorsal, the third, fourth and fifth dorsal spines the longest—about one-third the depth of body. Color in spirits: Grayish, with a wash of olive; more or less indistinct dusky mottlings on back and sides; sometimes a large black splotch on middle of sides. Axis of pectorals bluish. Fins yellowish white. Two specimens. Length 8–10 inches. Guam, June 14, 1900. *Hab.* Marshall Islands, Marianas.

### 111. **Lutianus monostigma** (Cuv. & Val.). **Buah.**

Head 2.50; depth 2.50; eye 4; interorbital 5; snout about equal to eye; maxillary 2.33; D. X 13; A. III 8. Scales 50. Body oblong, somewhat compressed. Maxillary reaching to below hind third of eye. Color in spirits: Whitish, with a slight wash of reddish brown. A distinct black spot on the lateral line under the anterior soft dorsal ray. Fins yellowish white. Two specimens. Length 2 inches. Guam, May 26, 1900. *Hab.* Polynesia, Marianas.

## FAMILY **CIRRHITIDÆ**.—CIRRHITOID-FISHES.

### GENUS **PARACIRRHITES** STEINDACHNER.

### 112. **Paracirrhites arcatus** (Perkins).

Head 3; depth 2.50; eye 4; interorbital 2 into snout; D. X 11; A. III 6. Scales 5-42-10. Maxillary 2.30. Body oblong and compressed. Branchiostegals 6. Preopercle denticulate. Teeth villiform in both jaws, with a few small canines; villiform teeth on vomer. Fins: Seven simple rays in the pectorals. Caudal square. Anterior rays of soft dorsal elongate. Base of anal 3.25 into base of dorsal. Color in spirits: Reddish brown, a wide white line above the lateral line from below fifth dorsal spine to the upper half of caudal. A white, brown-edged semicircular ring obliquely behind eye. Three narrow oblique whitish lines on sub-opercle. One specimen. Length 4.5 inches. Guam, June 2, 1900. *Hab.* From Mauritius to Pacific, Marianas.

## FAMILY **GARRIDÆ**.—MOJARRAS.

### GENUS **GARRES** CUVIER.

### 113. **Garres argyeus** Cuv. & Val.

Head 3.33; depth 3; eye 3.50; mandible 2.20; interorbital 3; D. IX 10; A. III, 8; P. 16; V. I 5. Scales 45. Body slightly elevated, oblong and compressed. Snout very protractile. Branchiostegals 6. Pseudobranchiæ well developed. The groove for the processes of the intermaxillary bones does not extend to the vertical from the centre of the eye. Teeth setiform, lower pharyngeal bones firmly united by a suture. Fins: Caudal well forked, scaled. Pectorals longer than head. The first dorsal spine is contained 1.50 into head. The dorsal fin has a scaly sheath into which the fin is received. Color in spirits: Uniform silvery, tip of dorsal dusky, a dusky line from dorsal to forehead, and an indistinct dusky blotch on tip of snout. One specimen. Length 15 inches. Guam, July 12, 1900. *Hab.* Red Sea, Australia, Marianas.

## FAMILY **POMACENTRIDÆ**.—DEMOISELLES.

### GENUS **POMACENTRUS** LACÉPÈDE.

### 114. **Pomacentrus punctatus** Quoy & Gaim.

Head 3; depth 1.66; eye 2.50; snout equal to eye; D. XII 15; A. II 13. Scales 24 in the lateral line, which terminates under posterior half of soft dorsal. Body short and compressed. Branchiostegals 5. Gill-rakers small, length less than pupil of eye. Teeth small setiform. Preopercle serrated. Fins: Caudal emarginate. Ventral fins somewhat produced, the longest ray greater than length of head. Length of pectorals slightly less than head. The soft anal slightly longer than soft dorsal. Color in spirits: White, with a slight wash of grayish brown. Each scale with a small blue dot, larger dots on sides of head, and a lighter wash on preorbitals. A black spot on base of posterior. Three soft dorsal rays and a black spot in axil of pectoral fins. All the fins yellowish white, a slight wash of dusky on ventrals and anal. Two specimens. Length 2 inches. Guam, July 1, 1900. *Hab.* Red Sea, Andamans, Malay Archipelago, Marianas.

### 115. **Pomacentrus trimaculatus** Cuv. & Val.

Head 3; depth 2; eye 3; snout slightly longer than diameter of eye, 2.66 into head; D. XII 15; A. II, 16; interorbital equal to eye. Scales 20 (with tubules). Body short and compressed. Suborbital and posterior edge of preopercle serrated. Teeth small. Fins: Ventrals with first rays rather elongate, equal to length of head. Pectorals 1.20 into head. Caudal emarginate. Color in spirits: Almost uniform greenish, a dusky splotch on posterior part of dorsal fin, some bluish spots on opercles and cheeks. Two narrow blue lines go from one orbit to the other. A row of bluish dots more or less connected directly below the eye. A narrow blue line from front of orbit to snout. One specimen. Length 2.5 inches. Guam, June 1, 1900. *Hab.* Andamans to Malay Archipelago, Marianas.

### 116. **Pomacentrus littoralis** Kuhl.

Head 3.20; depth 2; eye 3.50; snout and interorbital equal to eye; D. XIII 14; A. II 14. Scales 19 in lateral line proper, which ends under middle of soft dorsal. Teeth in single row in both jaws. Sub-orbital and vertical limb of preopercle serrated. Body short and compressed, the chin and forehead equally convex. Greatest depth of preorbital about one-half diameter of eye. Fins: Caudal emarginate. Ventrals longer than head. Pectorals equal to head. Base of anal 2.20 times into base of dorsal, the longest soft dorsal rays about equal to longest soft anal rays. Color in spirits: Brownish olive, either uniform or with some indistinct darker spots. A black spot at base of pectorals. An indication of bluish markings on sides of head, *i. e.*, on sub-orbital. Five specimens. Length 2–4 inches. Guam, June 1, 1900. *Hab.* Andamans, Malay Archipelago, Australia, Marianas.

### 117. **Pomacentrus bankanensis** Bleek.

Head 3.50; depth 2; eye 3; snout and interorbital equal, and each slightly less than the eye; D. XIII 14; A. II 15. Scales 17 to where line terminates. Sub-orbital and preopercle serrated. Body short and compressed. Branchiostegals 5. Fins: Ventrals slightly longer than head. Pectorals equal to head. Base of anal 2 into base of dorsal. Caudal emarginate. Color in spirits: Brownish, each scale with a blue dot. Two narrow blue lines on forehead, converging on snout and extending on to back. A deep blue, almost black spot on upper opercle; another margined with bluish white on bases of the eleventh, twelfth and thirteenth soft dorsal rays. Pectorals and caudal yellowish white. Ventrals, anal and dorsal more or less dusky. Three specimens. Length 1.50–3.50 inches. Guam, June 2, 1900. *Hab.* Andamans, Malay Archipelago, Marianas.

## GENUS **AMPHIPRION** BLOCH.

### 118. **Amphiprion ephippium** Bl. **Gadudog.**

Head 3.25; depth .75; eye 4 into head; profile rounded and blunt; D. X, 16; A. II, 14. Scales 7-40-18. Color: Brownish black, lighter anteriorly with a white band. Blue in life. One and one-half times as wide as eye, extending from the neck to eye, and down along the opercle and preopercle, ending in an acute angle on the sub-opercle. Fins: Ventrals and anal black. Pectorals, caudal peduncle and fin yellow. The spinous dorsal is dusky, the soft dorsal is light yellow. The posterior of caudal and anal is rounded; the posterior of dorsal forms an acute angle. The interorbital space is about twice as wide as eye. The opercles are all distinctly toothed and ridged on their posterior parts. Four specimens, 3–4.50 inches in length, were secured inside the reef, Agaña, Guam, June 14, 1900. *Hab.* Sea of Amboyna, Polynesia, Marianas.

### 119. **Amphyprion bicinctus** Rüpp.

Head 3.50; depth 2; eye 3 into length of head and less than length of snout; D. x, 16; A. II, 14. Scales about 7-44-20. Color: Blackish brown, with two china-white cross bands—blue in life; the first is of equal width with eye and extends over the neck vertically down to lower edge of opercle, the other extends vertically down from the eighth–ninth dorsal spine to the anal opening. Anterior part of head, thorax and fins orange. Fins: Posterior of anal and dorsal fins form acute angles. The caudal is emarginate, the upper lobe produced. Pectorals long, reaching to second white band. Teeth: In single series, small, conical. Opercle and preorbital armed with teeth, those on the opercle and sub-opercle being almost as long as width of pupil. One specimen secured at Agaña, Guam, July 14, 1900. Length 3 inches. *Hab.* Red Sea, Polynesia, Marianas.

## GENUS **ABUDEFDUF** FORSKÅL.

### 120. **Abudefduf septemfasciatus** Cuv. & Val.

Head 3.20; depth 1.86; eye 3.86; interorbital 2.50; D. XIII 12; A. II 11; V. I 5. Scales 3-22-11. Body oblong, compressed and elevated. Snout 2.50 into head. A small eyelid on upper anterior part of eye. Preoperculum not denticulate. Teeth fixed, compressed, in a single series. Fins: Vertical fins scaled. The caudal well forked, the upper lobe the longest. Length of longest dorsal ray 1.20 into head, length of longest dorsal spine 1.66 into head. Pectorals equal to length of ventrals, slightly longer than head. Anal rounded, the longest ray equal to longest ray of dorsal; the base is 2.66 times into base of dorsal. A small flat spine from posterior margin of opercle. Color in spirits: Ground color of silvery grayish, with seven brownish cross bands which are broader than the interspaces; first, rather indistinct from occiput to preoperculum; second, from nape and anterior base of dorsal to pectoral; third, fourth, fifth and sixth extend from the dorsal fin; the seventh from a band on the caudal peduncle directly behind the dorsal and anal fins. Fins dusky, except the pectorals which are whitish with a black spot on upper base. Upper part and sides of snout blackish. One specimen. Length 6.50 inches. Guam, June 1, 1900. *Hab.* Mauritius to Philippine Islands, coast of China, Marianas.

### 121. **Abudefduf brownriggii** Benn.

Head 3.68; depth 3; eye 2.66; snout and interorbital space equal and less than eye; D. XIII 13; A. II, 13. Scales 26. Inferior orbital and preopercles not serrated. Body compressed and rather short, the snout and chin quite short and rounded. Color in spirits: Bluish to yellowish brown, some with small blue dots, some specimens with one or two black spots on base of soft dorsal fin. One specimen has a lighter yellowish band around caudal peduncle, and a large yellow splotch on opercles. Some specimens have two bluish lines on forehead. Four specimens. Length 1–3.25 inches. Guam, June 1, 1900. *Hab.* Polynesia, Marianas.

### 122. **Abudefduf antjerius** Kuhl.

Head 3; depth 2.20; eye 3; snout and interorbital space equal, and less than eye; D. XIII 13; A. II 13. Scales 26. The scales on top of head are continued forward to anterior margin of eye. Body short, compressed. Branchiostegals 5. Pseudobranchiæ present. The anterior profile is rather more short and stubby than in most species of this genus. Fins: Caudal slightly forked. Pectorals about equal to length of head. Base of anal 2.55 into base of dorsal. Color in spirits: Brownish, almost without markings, to bluish with two or three minute lighter dots on each scale. A black spot at the base of dorsal. One specimen is lighter on belly and thorax. A blue line along sub-orbital. A black spot in upper axis of pectorals. Caudal yellow. Pectorals yellowish white, remaining fins dusky. Two specimens. Length 2 inches. Guam, July 14, 1900. *Hab.* From Red Sea to India and Malay Archipelago, Marianas.

### 123. **Abudefduf lacrymatus** Quoy & Gaim.

Head 2.66; depth 2.05; eye 2.86; snout equal to interorbital and less than orbit; orbitals and preopercles not serrated; D. XII 14; A. II 13. Scales 27. The tubules of lateral line ending under middle of soft dorsal, the line being continued by small circular pores. The preorbital above angle of mouth one-half diameter of eye. Body short and compressed. Branchiostigals 5. Pseudobranchiæ present. Teeth small, compressed, and in a single row. Fins: Ventrals equal to length of head. Caudal emarginate. Base of anal 3 into base of dorsal. Color in spirits: Brown, with small scattered blue spots, some specimens almost plain. Hind portion of soft dorsal and caudal yellowish white. Pectorals white with black at base. Anal and ventrals dusky. Seven specimens (young). Length 1–2 inches. Guam, July 23, 1900. *Hab.* Coast of Java, Ternate, Marianas.

### 124. **Abudefduf dickii** Lienard. **Fomho.**

Head 3.20; depth 1.66; eye 3; snout equal to eye; interorbital 2.66 into head; D. XII 15; A. II 14. Scales 30. Body short and compressed. Opercles entire. Teeth compressed and in a single row. The tubular portion of the lateral line stops below posterior end of soft dorsal fin. Fins: Caudal well forked. The anterior rays of dorsal and anal somewhat prolonged. Rays of ventral equal to or slightly longer than head. Vertical fins scaled. Color in spirits: Grayish brown, with a black band on posterior third of body, descending from third–seventh dorsal rays to middle of soft anal. Caudal and pectorals yellowish white, slightly dusky at tip, the remaining fins dusky. One specimen. Length 4 inches. Guam, June 14, 1900. *Hab.* Samoa, Caroline Islands, Marianas.

### 125. **Abudefduf amboinensis** (Bleeker).

Head 2.30; depth 2.33; eye 2.66; interorbital equal to orbit; maxillary 2.66; scales 2-27-7; D. XIII 9; A. II 10. Body oblong, compressed. Snout shorter than diameter of eye, each jaw with about 40 small teeth. Fins: Dorsal and anal fiins with their middle rays longest. Caudal deeply forked with the lobes much produced. Pectorals and ventrals of about equal length, 1 into head. Color in spirits: Brownish violet, slightly lighter below. A deep brown spot at base and in axil of pectorals. All the fins more or less washed with bluish, except pectorals which are white. Six specimens. Length 3.50 inches. Guam, June 14, 1900. *Hab.* Amboyna, Marianas.

## GENUS **TETRADRACHMUM** CANTOR.

### 126. **Tetradrachmum aruanum** Linn.

Head 3.50; depth 1.75; eye 2.75 into length of head; snout slightly shorter than width of eye; D. XII 13; A. II 11. Scales 3-26-11. Color: Whitish with three broad black cross bands, the first ascending obliquely upwards and back from the chin through eye to base of spinous dorsal; the second covers the ventral fins and extends in a slightly curved course to the fifth–ninth dorsal spines; the third embraces the soft anal, extends ventrally upwards on to the soft dorsal. Caudal fin white. The interorbital space is white. This is a very abundant little fish about the coral reefs, and were easily caught by lifting the chunks of dead coral out of the water and holding it over a net, the fishes, which were hidden in the holes of the coral, dropping out into the net. One hundred and twenty-five specimens were secured. Length .50–2.50 inches. Guam, June, 1900. *Hab.* Eastern coast of Africa, seas of India, Polynesia and New Zealand, Marianas. Numerous at the Andamans, Nicobars and Burmah. Much rarer in western than in eastern India.

## Family **LABRIDÆ**.—Uresse-fishes.

### Genus **HARPE** Lacépède..

### 127-128. **Harpe axillaris** (Benn.). **Higum.**

Head 3; depth 3; eye 4.66; interorbital 3.50; D. XII 10; A. III 12. Scales 4-32-12. Body oblong and compressed. Branchiostigals 6. Pseudobranchiæ present. Teeth: The four anterior canines conical and free, teeth on sides of jaws in single row, a posterior canine at angle of jaws. Fins: Caudal square. Pectorals and ventrals of about equal length, 1.50 into head. Base of anal 2.25 into base of dorsal. Color in spirits: Head and anterior third of body brown, posterior two-thirds yellowish white (salmon color in life). Caudal yellow. Spinous dorsal brown. Posterior half of soft dorsal and anal fins yellowish white. Ventrals more or less spotted with brown. A deep black spot on first three dorsal spines, another on upper part of first three dorsal rays. A bright black spot on base and in axil of pectoral fins. A big black spot on outer half of first five anal rays. Two specimens. Length 4–6.50 inches. Guam, June, 1900. *Hab.* Seas of India to New Hebrides, Marianas.

### Genus **ANAMPSES** Cuvier.

### 129. **Anampses cœruleopunctatus** (Rupp.). **Tatalum.**

Head, from end of opercle flap to tip of snout, 3; depth 3; eye 6.50; interorbital 3.66; D. IX 12; A. III 12; P. 13; V. I 5. Scales 5-28-10. No scales on head. Body oblong, compressed. Branchiostegals 6. Teeth in jaws in one row, the two front ones being prominent, directed forward with compressed cutting edges. Lateral line continuous, bending down for three rows of scales under seventh dorsal ray. Fins: Caudal slightly rounded. Pectorals 1.50 into head. Ventrals 2. Base of anal about equal to head, 2 into base of dorsal. Color in spirits: Brownish, each scale with a round blue spot margined with black. Head unspotted, but with 8–10 blue lines, most of which radiate from the eye, three extend almost vertically down from the orbit. Base of pectorals black, pectorals yellow. Ventrals dusky, the first rays blue. Caudal dusky, with numerous blue spots. Dorsal and anal with two or three rows of spots or lines. One specimen. Length 8 inches. Agaña, Guam, June 14, 1900. *Hab.* Red Sea, east coast of Africa, Mauritius, seas of India, Polynesia, Marianas.

### Genus **CHEILINUS** Lacépède.

### 130. **Cheilinus trilobatus** Lacép. **Gadu.**

Head 2.50; depth 2.66; eye 6.50; interorbital 4.50; D. IX 10; A. III 8; P. 11; V. I 5. Scales 2-22-5. Lateral line interrupted. Head scaled, two rows of scales on the cheeks, three scales in lower row which overlap the lower limb of preopercle. Teeth in a single row, the two anterior teeth in each jaw enlarged canines; no canine tooth at angle of jaws. Lower pharyngeals ⊥ shaped, the teeth of the lower limb rounded and in two rows, the middle one the largest. Color in spirits: Greenish, head with whitish (red in life) red stripes and dots, three very distinct oblique lines running from eye down sides of snout. Each scale of body with whitish vertical lines (red in life). The body is indistinctly banded with about five very wide dusky bands, the most distinct ones covering about half of the caudal peduncle. Vertical fins green with whitish margins. Pectorals yellow, ventrals green. One specimen. Length 8 inches. Guam, June 2, 1900. *Hab.* East coast of Africa, China, New Hebrides, Marianas.

### 131. **Cheilinus fasciatus** (Bl.).

*Young:* Head 2.60; depth 2.50; eye 4.20; D. IX, 10; A. III 8; P. 11; V. I 5. Scales 23. Lateral line interrupted. Two rows of scales on the cheeks, the lower row with three scales. Two anterior teeth enlarged, canines; no canine tooth at angle of jaws. Color in spirits: Green, with seven and one-half narrow yellowish cross bands, two incomplete ones on the nape. The third is from the 3–4 dorsal spines to posterior of ventrals; the fourth is from the sixth dorsal spine to mid-way between ventrals and anal; the fifth is from 8–9 dorsal spine to 1–3 anal spine; the sixth is from 3–4 dorsal ray to anal; the sixth and seventh are on the caudal peduncle, the seventh occupying the base of the caudal fin. The thorax and lower half of head and tip of snout are yellowish white (probably red in life). A short black line crosses the opercular flap and base of pectorals. One specimen. Length 3 inches. Agaña, Guam, June 2, 1900. *Hab.* Polynesia, Marianas.

### 132-134. **Cheilinus nigropinnatus** sp. nov.

Head 2.50; depth 2.55; eye 3.75; snout 3.50, about equal to interorbital; D. IX 10; A. III 8, the third anal spine the longest; V. I 5; P. 11. Scales 2-22-6. Lateral line interrupted. Teeth in a single row in each jaw, the six anterior ones the largest, curved and projecting. Snout sharp-pointed, mouth protractile. Cheeks with 2 rows of very large scales which entirely cover the whole of preopercle. The scales all over the body are distinctly striated. The tubes of the lateral line are unbranched. Body oblong, slightly compressed. The upper profile from anterior base of dorsal to tip of the pointed snout almost straight and on an angle of 20° with axis of body, its length 2.50 into length of fish exclusive of caudal. Eight rows of scales in front of dorsal. Pharyngeal teeth ⊥ shaped with 2 rows of teeth on posterior limb. Fins: Origin of dorsal slightly posterior to origin of ventrals. Base of anal 2 into base of dorsal. Pectorals 2 into head. Ventrals 1.75 into head. Color in spirits: Very light brown (dull red in life), the free portion of tail with a distinct band of yellowish half as wide as eye and margined with dusky around anterior part. Another yellowish band bordered more or less distinctly with dusky just back of eye over the nuchial region to lower edge of opercles. Ventral fins jet black and covering a dusky spot on belly. The three anterior dorsal and anal rays each have a large black spot margined with yellowish. More or less dusky on tip of spinous dorsal; otherwise fins yellowish white. Three specimens. Length 3 inches. Guam, May 25, 1900. *Hab.* Marianas. This species seems to be a connecting form between *Cheilinus* and *Pseudocheilinus*. It is doubtful if the latter genus is well founded. Type of species No. 134 B. P. B. M.

## GENUS **CORIS** LACÉPÈDE.

### 135-136. **Coris pulcherrima** Gunth.

Head 3.55; depth 3.55; eye 6.50; interorbital 5.66; D. IX 12; A. III 12. Scales small, 84 in lateral line Body oblong, compressed. Branchiostegals 6. Teeth in a single row, no posterior canine teeth. Lateral line continuous. Fins: Caudal rounded. Pectorals 1.50 into head. The first dorsal ray elongate. Base of anal much longer than head, 1.50 into base of dorsal. Color in spirits: Dark brown with wash of bluish, blue dots the size of pupil scattered over the body, becoming more numerous on posterior part of fish. A series of blue dots run from eye along the base of dorsal fin. Two broad reddish violet stripes (rather indistinct in specimens before me) on the sides of head, one from tip of snout through eye to flap of opercle, the other just below the orbit from gape to posterior edge of opercle on a line with base of pectorals. There is a dark violet line on the isthmus. The general color of head is a shade lighter with a yellowish wash. Lips yellow. Caudal and pectorals bright yellow. Dorsal and anal yellowish with 2 rows of blue dots and margined with blue. Ventrals yellowish with wash of bluish, the first rays of deep blue. Two specimens. Length 6–8 inches. Agaña, Guam, July 12, 1900. The material at hand will not warrant the writing of *C. pulcherrima* with *C. formosa*. *Hab.* Western Pacific, Polynesia, Hawaiian Islands, Marianas.

### 137. **Coris aygula** Lacép. **Tatanung.**

Head 3.20; depth 3.20; eye 8.25; interorbital 5; D. IX 12; A. III 12; P. 14; V. I 5. Scales 19-65-5. Lateral line continuous. No scales on the head. Nape of neck with rather prominent hump. Body oblong, compressed. The upper lip is very broad, with folds. Teeth: The two anterior teeth are large, curved canines; no canine tooth at angle of jaws; pharyngeal teeth ⊥shaped, with blunt round teeth in more than 2 rows on lower limb. Fins: Caudal sub-truncate. Pectorals 1.66 into head. Outer ray of ventrals elongate, 1.30 into head. Base of anal 1.66 into base of dorsal. The 2 anterior dorsal spines somewhat elongate. Color in spirits: Blackish, fins seem to be almost uniform with color of body, except there is a wash of bluish green on the pectorals which are margined with yellow. The opercular flap is a very deep blue. One specimen. Length 13 inches. Guam, June 28, 1900. *Hab.* Mauritius, Red Sea, Australia, Marianas.

## GENUS **HALICHOERES** RUPPELL.

### 138. **Halichoeres hortulanus** Lacép.

Head 3; depth 3; eye 6.50; interorbital 4.66; D. IX 11; A. II 10; P. 14. Scales 3-24-10. Lateral line continuous, but bent abruptly down on posterior part of body. No scales on head, the scales on thorax smaller than those on sides. Teeth: A single row in each jaw, the four anterior ones in each jaw curved canines; the two anterior ones the longest; a single canine at angle of jaws. The pharyngeal teeth are ⊥ shaped, with one or two big teeth in middle of lower limb slightly convex, 1.50 into head, same length as pectorals. Base of anal is contained 2.66 into base of dorsal. The first ventral rays prolonged 1.66 into head. Color in spirits: Posterior two-thirds of body a light brown slightly washed with yellowish. Each scale has a square black spot in centre; belly without spots. Head with bluish longitudinal bands, two on the forehead; another extends from shoulder to snout through the upper part of eye; the next is a short line from posterior edge of orbit to shoulder, two short lines on opercle, and the other extends from anterior edge of opercle to the under jaw. The anterior part of back has a series of round bluish spots. Two yellowish spots on the back, the first below 4–5 dorsal spine, the second below the 4–5 dorsal rays; the anterior of these spots is followed by a black splotch larger than the spot. Caudal, anal, ventral and pectoral white, with wash of yellowish. Dorsal fin with brown oblique lines enclosing round spots. Two specimens. Length 1–6 inches. Agaña, Guam, July 14, 1900. *Hab.* Africa to Polynesia, Marianas.

### 139. **Halichoeres nebulosus** (Cuv. & Val.).

*Young:* Head 3; depth 3.50; eye 4.20; interorbital 5; D. IX 11; A. III 11; P. 13; V. I 5, the outer rays prolonged. Scales 2-29-9, no scales on head. Lateral line continuous. Scales on thorax smaller than on sides. Body oblong, compressed. Pharyngeal teeth ⊥ shaped, the two middle ones on lower limb the largest. Teeth of jaws in single row, the two anterior ones in each jaw the largest, sharp, conical, and projecting forward. A canine tooth at angle of jaws. Fins: Caudal square. Pectorals 1.66 into head, its base 5, its shortest ray 3 into head. Base of anal 1.83 into base of dorsal. Color in spirits: Upper part of body with light and dark blotches and spots. Three or four indistinct short silvery bands on sides of belly covered by the pectorals. A bluish black spot just back of orbit. Opercular lobe dark violet preceded by a silvery spot. About 7 yellowish white spots on the bach, along the base of the dorsal. Head with several reddish violet bands, the outer one extending from gape to the middle of opercle; the one just above it extends from maxillary through lower part of orbit, where it branches, one branch curving down along the posterior margin of the opercle but not forming a complete ring. There are about three yellowish cross bands on top of the head. Dorsal fin with a small black spot between its 1–2 spines and a larger black ocelus between the 2–3 soft rays, and blue-tipped with a yellowish white dark-edged band through the middle. Caudal yellowish. Ventrals and pectorals yellowish white. Three specimens. Length 3 inches. Guam, July 14, 1900. *Hab.* Red Sea, East Indies, Marianas.

### 140. **Halichoeres opercularis** Gunth.

*Young:* Head 3; depth 3.50; eye 4; interorbital 5; D. IX 11; A. III 10. Scales 2-29-9. Body oblong, compressed. Color in spirits: Scales of upper half of body have dark brown margins with lighter centres. A series of five or six whitish spots along base of dorsal. A silvery dark-edged band from gape to opercles. A violet spot behind orbit; another larger one edged with dark brown on the extremity of operculum. Lower half of body whitish, with two silvery lines on the sides of abdomen descending obliquely forward. A black spot on dorsal between 1–2 spines; a larger yellow-edged spot between 1–3 dorsal soft rays. Anal white with grayish spots at base. Caudal yellow, tipped with dusky. Two specimens. Length 2 inches. Guam, July 14, 1900. *Hab.* Fiji Islands, Amboyna, Marianas.

### 141. **Halichoeres leparensis** (Bleek.).

*Young:* Head 3.30; depth 4.20; eye 4; interorbital 4. Scales 26. Lateral line continuous, no scales on head. Body oblong, compressed. Color in spirits: Faded into almost uniform light olive gray. Dorsal fin with large black spot between 1–2 spines and 1–2 soft rays; also indication of 8–9 minute dark dots along base of dorsal and a small black spot at base of caudal; otherwise fins white. An indication of narrow vertical bands—a brownish white line from behind margin of orbit continued in lighter shade of color to caudal. One specimen, badly faded. Length 1.50 inches. Guam, July 14, 1900. *Hab.* East Indian Archipelago, Marianas.

### 142. **Halichoeres nigropunctatus** sp. nov.

Head 3.33; depth 3.33; eye 5; interorbital 4, equal to snout; D. IX 11; A. III 11; P. 12; V. I 5. Scales 2-30-9. Lateral line continuous. No scales on head; scales on the thorax smaller than those on the sides. Teeth: A single row, with the four anterior teeth in each jaw enlarged; projecting canines; a canine tooth at the angle of the jaws. The pharyngeal teeth ⊥ shaped, with one very large tooth in the middle of the cross, flanked on each side by two smaller ones, the anterior limb of the ⊥ with about 12 saw-tooth-like teeth. Body oblong, compressed. Fins: The caudal is square; length of its exposed rays on median line equal to longest ray of ventrals, 1.66 into head. Height of caudal peduncle 2 into head. Longest ray of pectorals 1.33 into head, the shortest ray 2.50, the base 4. Base of anal 1.66 into base of dorsal. The last ray of dorsal equal in length to last ray of anal, 2.50 into head. The spinous portion of dorsal fin not so high as soft portion. Color in spirits: Ground color pearl white with a slight wash of pinkish and yellow. The entire body and opercles covered with black spots, larger than the interspaces; in fact, the ground color, except on the back and belly appears as narrow yellowish white reticulations all over the body. These colors, being very sharply defined, give the fish a most striking calico-like appearance. On the back, for a space about two-thirds the width of eye on each side of the dorsal fin the ground color appears without black markings, which gives the appearance of a yellowish band from the snout along the back to caudal fin. This yellowish white of the back is marked by about 9 small indistinct silvery splotches on each side of the dorsal; the last three form short narrow silvery bands over the caudal peduncle; a small silvery line extends down on the snout from the forehead to lips; a pinkish dark-margined stripe half as wide as eye from anterior of orbit to maxillary; a silvery stripe of equal width below it from orbit to gape; below this is another pinkish dark-edged stripe from lower margin of orbit, forming a complete band under chin; a branch of this line encircling a silvery spot on the posterior part of each lower mandible. The remaining markings on sides of head are uniform with markings of the body. Caudal fin yellowish with five dark cross bands. Dorsal with short oblique line alternating with dark lines which fade out on upper part of fin. Anal with 12 round black spots edged with silvery white on its inner half; outer half whitish with faded darker spots; margin of fin blackish. Ventrals with a black spot at base, and two dark cross bands on the ray, the inner one wider and most distinct; outer third of fin yellow. Pectorals yellow. One specimen. Length 4.50 inches. Agaña, Guam, July 2, 1900. *Hab.* Marianas. Type is No. 142, B. P. B. M.

## Genus **JULIS** Cuvier & Valenciennes.

### **143-146. Julis anertensis** (Gunth.).

Head 3.50; depth 3.50; eye 5.50; interorbital 4; D. VIII 13; A. II 13. Scales 28. Body oblong, compressed. Snout not produced. Anterior teeth conical. Inferior pharyngeal teeth not confluent or pavement-like. Branchiostegals 6. Fins: Caudal deeply lunate. Length, longest ray equal to head; the shortest ray 2.20 into head. Pectorals 1.25 into head. Ventrals 1.50. Base of anal about 1 into head, 2 into base of dorsal. Color: Head violet with about five oblique or longitudinal lines of greenish with darker edges; three of these lines centre in the orbit. Body greenish, the vertical streak on each scale very indistinct. Pectorals with a broad oblique black band across its posterior half, and with a black spot at the axis. A black spot between second and third dorsal spines; two fine brown lines run the entire lenth of the dorsal, one near the base, the other just above the middle of its height; they are the margins of a broad band of greenish along the middle of the fin. Anal with a similar line running a little above its middle, separating the bluish basal portion from the outer yellowish white. Caudal yellowish white with a yellowish band having fine brown edges along the upper and lower margins of the fin. Six specimens. Length 2.50–7 inches. Guam, July 14, 1900. *Hab.* North coast of Australia, New Hebrides, Norfolk Island, Marianas.

### 147. **Julis purpurea** (Forsk.).

Head 3.33; depth 3.33; eye 7.50; interorbital 4.33; D. VIII 13; A. II 11; V. I 5. Scales 27. Head entirely naked. Body oblong, slightly compressed. Snout not produced. Branchiostegals 6. Teeth in a single row, two anterior canines in each jaw, no posterior canine. Fins: The caudal is slightly emarginate, the upper and lower rays being slightly produced. Pectorals 1.50. Ventrals about 2. Base of anal equal to length of head, 1.66 into base of dorsal. Color in spirits: Grayish with a wash of green, two broad red bands (faded into whitish) from head to caudal fin; another brownish violet band along the back to the caudal fin, the red lines along the sides send up vertical processes joining each other. A broad red line extends from posterior part of orbit obliquely back, branching into two on the opercle. An orange line on lips and another across snout just above the lips. Top of head purplish. A yellowish line across upper boundary of interorbital. Dorsal fin with upper half pea-green, lower half whitish separated by a dusky line. A black spot between 1–3 spines. Anal with upper half yellowish white, the lower half greenish separated by a dusky line. Pectorals yellow with black tips. Caudal greenish. One specimen—length 8 inches, and 8 young, 2–5 inches. Agaña, Guam, July 14, 1900. *Hab.* Seas of India, Africa, Polynesia, Marianas.

### 148. **Julis punctatus** sp. nov.

Head 3.25; depth 4; eye 6; interorbital 4.25; D. VIII 13; A. III 10; P. 15; V. I 5. Scales 8-27-2. Head entirely naked. Scales on thorax smaller than on sides. Body oblong, slightly compressed. Teeth in single row, two large canines in each jaw,

no canine at angle of jaws. Fins: Caudal is slightly convex with the angles scarcely prolonged. Pectorals 1.50 into head, its base 4.50; the shortest ray is equal to base. Ventrals short, their longest ray 2.25 into head. Base of anal is contained 1.86 into base of dorsal. The last soft rays of anal and dorsal of equal length, 4 into head. Anterior dorsal spine 5.75. Color in spirits: Ground color whitish with wash of grayish olive. The scales of the back and down to lateral line on sides have dark brown centres. A black spot about size of eye forms a saddle on the caudal peduncle just back of the dorsal fin. The scales of the lateral line are without dark centres. On the sides of the body below the lateral line are two longitudinal rows of alternating dark and white (probably red in life) blotches of about equal size, there being six pairs of dark blotches on each side; these blotches are separated vertically by a row of scales without brown centres. Belly, thorax and chin without markings. Sides of head without definite lines, a yellow dark-edged band over snout. Top of head and upper part of snout with narrow bluish reticulations. Caudal clear yellow (base probably red in life). Dorsal yellow with a dusky blotch between 2–3 dorsal spine. Pectorals yellow with axil dusky. Ventrals yellow. The upper parts of opercles are brownish. One specimen. Length 7 inches. Agaña, Guam, July 14, 1900. *Hab.* Marianas.

### GENUS **STETHOJULIS** GUNTHER.

### 149. **Stethojulis renardi** (Bleek.).

Head 2.83; depth 3.75; eye 6; interorbital 4.25; D. IX 11; A. II 11; P. 14. Scales 10-29-2; no scales on the head; the scales on the thorax as large or larger than those on the sides. Lateral line continuous. Body oblong, compressed. Fins: Base of pectorals slightly above the axis of body, their length 1.50 into head. Ventrals 2.60 into head. Base of anal 2.20 into base of dorsal. Caudal rounded. Color in spirits: Bluish above, white with slight wash of blue below. Body with four longitudinal stripes; the upper, very narrow and indistinct, extends from occiput along base of dorsal fin; the others are yellowish white—the second is from in front of nostrils through upper part of eye to caudal; there is a small black dot above its termination; the third extends from the maxillary, below the eye to a line with posterior edge of base of pectorals; the fourth, so far as can be distinguished, extends up from the isthmus along the gill openings to a little below base of pectorals, whence it curves backwards and ends on a line front of anal. One specimen. Length 4 inches. Agaña, Guam, July 14, 1900. *Hab.* East Indian Archipelago, Marianas.

### 150. **Stethojulis fulvoventris** sp. nov.

Head 3; depth 3.20; eye 4.75; interorbital 4.20; D. IX 11; A. III 11; P. 15; V. I 5. Scales 2-29-9. Lateral line continuous.

No scales on the head, the scales on the thorax larger than on the sides. Upper lip broad, lower lip double. The pharyngeal teeth ⊥shaped, not pavement-like. Teeth in jaws in single series, the anterior ones (in young) not especially long, a canine tooth at angle of jaws. Body oblong, compressed. Branchiostegals 6. Fins: Caudal is rounded. Pectorals 1.50 into head, base 4.50, shortest ray equal to base. Base of anal 1.86 into base of dorsal. Ventrals 2.33 into head. Color in spirits: Above brownish with purplish wash, each scale with three or four small dots of bluish green, dots thicker and more minute on top of head and upper half of opercle. Sides of body below axis, belly, thorax and chin yellowish white with slight bluish wash; the centre of the scales a shade darker, which gives an indistinct streaked appearance. A yellowish white line, broadest anteriorly, extends from lips across cheeks, just touching lower margin of orbit, and back to caudal, becoming indistinct posteriorly. Just above this line, extending from head to caudal fin, is a narrow dusky line. Two small black dots on each side of caudal peduncle; these dots are margined with blue. Base and axes of pectorals blackish. A curved white line, wide as the pupil, extends from edge of opercle above and around the inside axis of the pectorals. Fins: All whitish, an indistinct indication of bluish dots on dorsal; no black spot on last dorsal ray. Four specimens. Length about 3.50 inches. Agaña, Guam, June 14, 1900. This species is near *S. strigiventer* (Benn.). *Hab.* Marianas. Type specimen 150 B. P. B. M.

## GENUS **GOMPHOSUS** LACÉPÈDE.

### 151-154. **Gomphosus pectoralis** Quoy & Gaim.

Head 2.66; depth 4; eye 7.5; interorbital 6.50; D. VIII 13; A. II 11. Scales 2-29-11. Snout much produced. Body oblong, compressed. Teeth conical, no posterior canines. Fins: Caudal truncate, the outer rays not produced. Pectoral 2 into head, its base equal to length of its shortest ray. Base of anal 1.86 into base of dorsal. Color in spirits: Reddish brown on top of head and body, becoming lighter on belly and whitish on thorax and lower half of head. The scales of body darker at their bases. A dark band from snout through eye—in some specimens two bands may be distinguished behind the eye. A black spot at upper axis of pectorals. Caudal yellow for its posterior half. Dorsal and anal dusky, with a narrow margin of yellow, the anal with a row of transparent spots on its inner half. Pectorals and ventrals yellow. Five specimens. Length 3–5.50 inches. Guam, June 19, 1900. *Hab.* Mauritius to Malay Archipelago, Marianas.

### 155-156. **Gomphosus tricolor** Quoy & Gaim. **Loro.**

Head 2.50; depth 4.20; eye 10.5; interorbitals 7; distance from anterior of orbit to tip of snout 1.86 into head; D. VIII 13; A. II 11.

Scales 2-26-8. Body oblong, elevated, compressed. Snout very much produced. Anterior teeth conical, no posterior canines. Branchiostegals 6. Fins: Caudal with its outer rays rather produced. Pectorals 2 into head. Base of anal 2 into base of dorsal. Color in spirits: Deep bluish, a yellow splotch extending from lower part of pectoral axis to a little above a lateral line on the shoulders; this splotch is as wide as the orbit. Pectorals dusky with a deep blue band across posterior third. Dorsal and anal fins yellowish, without markings of any kind. The caudal is yellow, with the three outer rays on each margin bluish green. Ventrals greenish. Two specimens. Length 10 inches. Guam, June 14, 1900. *Hab.* East Indian seas, west part of Pacific, Marianas, Hawaiian Islands.

### 157. **Gomphosus pacificus** sp. nov.

Head 2.50; depth 4; eye 7.5; interorbital 6; D. VIII 13; A. III 11. Scales 2-27-9, the tubes of the lateral line much branched. Body oblong, compressed, the snout much produced. Teeth small, conical; no posterior canine teeth. Branchiostegals 6. Height of caudal peduncle 3 into head. Fins: Caudal truncate. Pectorals are half as long as head, their base 6 into head, and their shortest fin ray is one-half the length of the longest ray. The base of anal is contained 2.55 times into base of dorsal. Ventrals short, about 3 into head. Color in spirits: Head, including lower part, back, caudal peduncle and sides a sepia brown, the scales with a black spot at base. The thorax and belly is lighter, being a bistre, without the dark spot at base of scales. A narrow, indistinct whitish line half as wide as eye in axis of pectorals and extending two rows of scales above the base of the fin. The pectorals are brown, with a broad indistinct white band across their outer half, the base of the fin black. Ventrals yellowish white, with outer rays reddish brown. Posterior half of caudal yellowish. The inner half of dorsal and anal is dark greenish, while the outer half is yellowish white. One specimen. Length 6.20 inches. Guam, June 14, 1900. This species is probably more nearly related to *G. pectoralis* than any other described form, but it differs markedly in having the under chin sepia brown instead of white, in having a whitish band on the pectorals, in the different length of the base of anal fin into base of dorsal, and in having a whitish line behind the pectorals; also in the different markings of the dorsal and anal fins. *Hab.* Marianas. Type is No. 157 B. P. B. M.

## GENUS **CHEILIO** LACÉPÈDE.

### 158. **Cheilio inermis** Bl.

Head 3; depth 7; eye 5.66; maxillary 4.20; mandible 2.59; interorbital 4 into length of snout; D. IX 14; A. III 12. Scales 50. Body elongated and nearly cylindrical, mouth more or less protractile. Teeth in a single row, the two anterior teeth in each jaw the largest, no posterior canines. Fins: Caudal slightly rounded. Pectorals 2.20 into head. Base of anal 1.40 into base of dorsal. Ventrals small, 1.50 into snout. Color in spirits: Brown, with a slight wash of reddish; lower parts white, a dark line along sides from caudal to eye. Caudal brownish. Dorsal, pectorals and ventrals whitish. Anal whitish, with short oblique lines and dots of pale bluish. The margin of the fin is dusky. One specimen. Length 8 inches. Guam, June 2, 1900. *Hab.* Red Sea, seas of India, Polynesia, Marianas.

## FAMILY **SCARIDÆ.**—PARROT-FISHES.

### GENUS **SCARUS** FORSKÅL.

### 466. **Scarus celebricus** (Bl.).

Head 2.66; depth 3; eye 8.50; interorbital about 3; D. IX 11; A. II 8; V. I 5; P. 15. Scales 2-23-6. Body oblong, oval. Jaws large, very convex, the upper slightly projecting. Anterior teeth soldered together; a conical tooth at the angle of the upper jaw. Upper lip narrow, not covering half the upper jaw. Scales very large, cycloid; lateral line interrupted; two rows of scales on cheeks, no scales on lower limb of preopercle. Fins: The first dorsal spine is the shortest, its length about equal to diameter of eye. Caudal is almost square. Pectorals 1.50 into head. Ventrals smaller, about 2 into head. Base of anal equal to length of pectorals, about 2 into base of dorsal. Color in spirits: The teeth are a faded bluish green, with cutting edges white. The general color of the fish is a dusky greenish. A line, probably red in life, passes longitudinally through or behind the eye; these lines, and indeed all the distinctive colorings, are badly faded. The caudal peduncle seems to be lighter in color. The fins have faded so the markings are not distinguishable, although evidently made up of two colors, probably red and green. One specimen. Length 8 inches. Agaña, Guam, July, 1900. *Hab.* China Seas, Western Pacific, Marianas.

### 160. **Scarus cypho** sp. nov.

Head 3; depth 3.20; eye 6; interorbitals 3.50; D. IX 10; A. III 9; P. 14. Scales 2-24-6, lateral line interrupted, the tubes branched. Two rows of scales on the cheeks, with five scales in lower row; the opercular limb is entirely bare. Pharyngeal teeth pavement-like, about twice as long as wide, the anterior ones the longest. Teeth in jaws quite projecting, their length equal to orbit; two canine teeth at angles of upper jaw. Body oblong, compressed; the upper profile of back quite convex. The snout is much produced. The lips are rather narrow, scarcely covering one-half the jaws. Fins: The caudal is lunate. The pectorals 1.33 into head, their base 5, their shortest ray 4. Ventrals 1.50. Base of anal 1.50 into head, 2.83 into base of dorsal. The dorsal has 4 series of scales in front of it and four behind it, its base is convex, its posterior rays are the longest, being about 3 into head. Color in spirits: A uniform light green, a darker blotch extending over top of head and upper part of opercles. Teeth greenish at base with white margins. Lips a brighter green with wash of yellowish, a narrow black line near their margins. Fins greenish, dorsal with narrow intermarginal line of black. Anal with broad edge of brighter green, a narrow black line through its outer third, inner two-thirds white with wash of green. Ventrals white with slight greenish wash. Caudal green, lighter in centre, with dusky intermarginal line. One specimen. Length 9.5 inches. Agaña, Guam, July 12, 1900. This species is characterized by the five scales in lower row on cheeks, its convex back, projecting snout, elongated dorsal fins, and rather narrow lips. Its coloring is similar, in spirits, to *P. bataviensis*, Bl. *Hab.* Marianas. Type is No. 160, B. P. B. M.

## GENUS **PSEUDOSCARUS** BLEEKER.

### 161. **Pseudoscarus bataviensis** (Bl.).

Head 3.25; depth 3.25; eye 6.25; interorbital 3.20; D. IX 10; A. III 9; P. 14. Scales 2-23-5. Two rows of scales on the cheeks, the lowest with six scales. The lips are broad, almost covering the upper teeth. A conical tooth at angle of jaws. The preopercular limb is entirely bare. Body oblong, compressed. The upper profile of back, from shoulders to middle of soft dorsal, straight. Snout short, blunt; length from anterior edge of orbit to tip of teeth 2.66 into head. Fins: Caudal is lunate, the outer rays being about one-third longer than middle ray. Pectoral ray 1.20 into head. Ventrals 1.50. Base of anal 1.50 into head, 2.50 into base of dorsal. Color in spirits: Greenish, more or less dusky on upper opercles and shoulders. Teeth whitish. Fins greenish, the caudal yellow in the middle, the tip black. Dorsal with dusky margin. Outer third of anal green, a black line through the middle, the inner two-thirds being greenish white. Ventrals with a wash of yellow. One specimen. Length 9 inches. Agaña, Guam, July 12, 1900. *Hab.* Batavia, Marianas.

### 162. **Pseudoscarus platodoni** sp. nov.

Head 2.66; depth 3.25; eye 6.50; interorbital 3.25; D. IX 10; A. II 9; V. I 5; P. 14. Scales 2-23-5, the lateral line interrupted. Two rows of scales on cheek, no scales on lower limb of opercle. Lips rather narrow, scarcely covering half the jaws. Body oblong, slightly compressed. Snout very blunt; from the interorbital to the posterior edge of upper teeth the profile is straight; the length of the upper front teeth being slightly greater than eye; no posterior canine tooth. There are 4 rows of scales in front of dorsal. The distance from anterior edge of orbit to tip of teeth is 2.50 into head. Fins: The caudal is slightly rounded, its length 1.66 into head. The longest ray of pectoral is 1.50 into head, its base 4.50. Base of anal is 1.50 into head, 2.25 into base of dorsal. The ventrals are short, about 2 into head—about equal to longest dorsal spine. Color in spirits: Olive brown, the scales covered with slightly darker centres. All the fins, with the exception of the pectorals, are black. Pectorals yellowish white, teeth yellowish white, chin whitish, iris yellowish. The young are similarly colored. Two specimens. Length 3–6 inches. Agaña, Guam, July 14, 1900. This species is chiefly characterized by the very broad yellowish teeth, which give the snout a very blunt—almost square—tip; by the narrow lip, and the uniform coloring of the body. *Hab.* Marianas. Type No. 162 B. P. B. M.

### 163. **Pseudoscarus sumbawensis** Bl.

Head 3; depth 3; eye 5.50; interorbital 3.25; D. IX 10; A. II 9; V. I 5; P. 14. Scales 2-24-5. Body oblong, compressed. Upper jaw slightly the longer. A sharp canine tooth at angle of upper jaws. Two rows of scales on cheek. The lower preopercular limb is naked. Upper lip very broad, almost covering the upper teeth. The pharyngeal teeth pavement-like, their width 2 into their length. Lateral line is interrupted. Fins: Caudal is emarginate, with angles produced. Pectorals 1.25 into head. Ventrals 1.25. Base of anal 1.50 into head, 2.50 into base of dorsal. Color in spirits: Violet-olive. Dorsal, anal and caudal fins darker. Ventrals and pectorals yellowish. Two specimens. Length 3–7 inches. Guam, July, 1900. *Hab.* Marianas.

## FAMILY **CHÆTODONTIDÆ.**—CORAL-FISHES.

### GENUS **CHÆTODON** (ARTEDI) LINNÆUS.

### 164-168. **Chætodon ephippium** Cuv. & Val.

Head 3.88; depth 1.66; eye 3.50; interorbital 4; D. XIII 23; A. III 22; V. I 5. Scales 9-37-14. Body elevated and strongly compressed. The snout rather produced, the lower jaw longer. Lower edge of the preopercle slightly serrated. Branchiostegals 6. Teeth setiform. Fins: Dorsal spines are of moderate strength, the longest spine 2 into head. Posterior part of dorsal and anal rounded, the soft dorsal has a short projecting filament. Caudal square, the longest ray 1.50 into head. Color in spirits: Yellowish white with about 9 indistinct brownish longitudinal lines, half as wide as iris, below the axis. A big black patch broadly edged with white anteriorly occupies all the upper posterior part of the fish, including most of the dorsal fin. Posterior edge of the dorsal yellow, followed by a narrow black line and terminally tipped with white.

A short and narrow but perfectly distinct ocular band of black extends through the eye and to about the width of the eye above and below the orbit. A short vertical line extends up from the base of the pectorals just behind the posterior edge of the opercles. Another narrow black line beginning at the base of the fourth dorsal spine extends obliquely downward and forward to near the base of the pectorals. Ventrals, pectorals, anal and caudal fins white. Tip of snout yellow. Iris yellow, invaded by the black ocular band. Four specimens, 3–4 inches in length, were secured inside the coral reef, Agaña, Guam, July 14, 1900. *Hab.* Western Pacific, Polynesia, Marianas.

### 169-171. **Chætodon satifer** Bl.

Head 3; depth 1.50; eye 3.50 into head; D. XIII 24; A. III 20. Scales rather large, about 35 in lateral line. Teeth setiform, the jaws rather projecting, the under one slightly the longer. A black ocular band, indistinct and narrow above the eyes; below it is distinct, slightly wider than eye and edged anteriorly with white. Color: Whitish; the posterior part, including caudal peduncle and fin, all of soft dorsal, and a broad edge to anal, a bright yellow. Body with about five darkish hypo-dermal bands passing backwards and upwards on the upper anterior third of body, and about ten passing downward and backward on posterior two-thirds of body. Top of dorsal behind the fifth ray with a round black white-edged spot. The soft dorsal is narrowly edged with black, and has a fine filament from upper posterior part. Soft anal and the caudal with a narrow submarginal line of black, the margin white. On the upper posterior third of the body two or three of the spaces between the black lines are colored yellow, which gives the appearance of there being three yellow lines angularly bent with the angle pointing forward on that part of the body. There are about five bright yellow lines on the forehead, between and above the eyes. The young specimen before me has the upper posterior third of body dusky; descending from the posterior part of this dusky patch is a rather indistinct blackish line extending into the soft anal fin where it forms an acute angle and extends forward. There is a very slight indication of this marking in the larger specimens. Three specimens, length 4–5 inches, were caught inside the reef. Guam, July 14, 1900. *Hab.* From the Red Sea through all the Indian Seas to Polynesia, Marianas.

### 172. **Chætodon citrinellus** (Brouss.).

Head 3.50; depth 1.75; eye 3.13 into head; D. XIV 21; A. III 17. Scales 6-40-14. Color: Yellowish with round bluish spots in the skin under the translucent scales, these spots forming more or less distinct, slightly oblique lines from head to tail, less distinct posteriorly. A black ocular band edged with yellow from base of spinous dorsal through eye to isthmus. Tip of snout black. Fins: Anal tipped with a black band, almost as wide as ocular band. This black band on anal is edged inwardly with a bright yellow band of about equal width. Pectorals, ventrals, caudal and dorsal white, the dorsal narrowly edged with dusky. The dorsal and anal forming an acute angle posteriorly. A series of four specimens were secured inside the coral reef, Agaña, Guam, July 9, 1900. These range in length from 3–3.75 inches. *Hab.* Polynesia, Molucca Sea, Marianas.

### 173. **Chætodon collaris** Bl.

Head 3.50; depth 1.20; eye 2.75 into head; snout obtuse, about equal in length to diameter of eye; preopercle slightly serrated; D. XII 26; A. III 21. Scales 5-45-22. Fins: The pectorals and spinous dorsal are white; the ventrals and anal are black; the caudal is white with two black lines and one yellow line near the end; the dorsal is grayish with a bright yellow line near edge of soft dorsal—this fin also has a minute subterminal line of black. The posterior part of dorsal and anal are sharply rounded, the general outline forming an acute angle. The caudal peduncle is black. Color in spirits: The general color is a blackish olive with irregular rows of longitudinal or oblique lines of yellowish round dots showing through each scale. This coloring extends from the black belly and anal fin up to the lateral line. In the specimen before me the lateral line is made very conspicuous by having five or six rows of the round yellow dots running parallel with it. It is very noticeable that these color dots are not so bright a yellow on the upper half as on the lower part of the body; the fading, however, is gradual. There is a broad black ocular band wider than the eye and edged with bright yellow, except on upper third; this black band extends to and embraces the ventrals. All the front part of head is black or dark brown, with a bright yellow line which forms the anterior border of ocular band, extending vertically down from the front edge of one orbit, under chin, to the other orbit. The interorbital space is slightly lighter brown and is indistinctly surrounded by pale yellowish lines, the upper one of which forms the upper anterior border of the black ocular band. From base of pectorals to base of ventrals and forward to ocular band there is a bright yellow area; above this and just back of ocular band there is a grayish area or band wider than the ocular band. This grayish color embraces all the dorsal fin and extends down to the lateral line. Variations: In the "Fische d. Sudsee" this species is figured as having the grayish coloring extending more than half-way down the sides with an abrupt whitish line (gray area in my specimen) between this color and the ocular band. In "Fishes of India" this species is figured with a narrow "bluish white" band just posterior of ocular band, and all the color dots run in a marked oblique direction, and apparently there is no difference in the coloring on the sides of the fish. Day's figure also shows an additional yellow ring around the snout. Four specimens were secured. Length about 2–4 inches. Guam, July 14, 1900. *Hab.* Seas of India to the Malay Archipelago, Marianas.

### 174. **Chætodon ornatissimus** (Solander).

*Young:* Head 3; depth 1.36; eye 2.50 into head; D. XII 24; A. III 23. Scales in lateral line 55. The snout is but slightly pointed and shorter than diameter of the eye. Fins: Ventrals and caudal yellow, the latter with black cross band in middle. Pectorals white, about equal in length to ventrals. Posterior edge of soft dorsal and anal yellow with black tips. Color: Yellowish white with seven dusky yellow oblique bands, about half as wide as orbit, extending backward and upward along sides of the body. A black band along the division of opercle and preopercle. A black ocular band, equal in width to iris, extends through the eye and around head; it is widest on forehead. Interorbital space black. A black line around snout and chin. Lower jaw black. Two specimens were secured inside the coral reef of Guam, June 9, 1900. Length 1.75 inches. *Hab.* From the Molucca Sea to Polynesia, Marianas.

### 175. **Chætodon lunula** Lacép.

Head about 3; depth 1.50; eye 3.50 into head, 1.20 into snout; D. XII 24; A. III 18. Snout slightly produced. Teeth setiform. Fins: Yellowish, white in spirits. Scales in lateral line 42. Color: A black ocular band, broader than eye, crossing the interorbital space and extending to branchiostegals. Head behind this band is white. Snout and throat yellowish white, white in spirits. Bordering on the white band on back of head is a triangular black area extending back to base of fifth dorsal spine; three oblique yellow lines extend across this black area up and backwards towards the dorsal, the lower one forming the lower border of the black area. About the seventh dorsal spine a black line begins, which widens and extends along the base of soft dorsal, forming a band on caudal peduncle. This black band on caudal peduncle is bordered front and rear with yellow. The remaining surface of fish is yellowish, slightly dusky above, with about fourteen indistinct dusky, oblique, epidermal lines on the sides extending upward and back. Caudal fin almost square, broadly white-tipped, with a fine sub-terminal curved line of black. In specimens preserved in spirits the yellow coloring all fades into white. Variations: The young have a black spot with white rim on the soft dorsal. In "Fishes d. Sudsee" this species is figured as having the ocular band extending down to the margin of the preopercle. It is so described by Day in "Fishes of India". Thus differing from the Guam specimens which have the ocular band extending to the branchiostegals. The Guam form also has more dusky on the upper part of body. Two specimens, length about 2.50 inches, were secured inside the coral reef near Agaña, Guam, July, 1900. *Hab.* Seas of India, Andaman Island to Malay Archipelago, Polynesia, Marianas.

### 176. **Chætodon fulcula** Bloch.

Head 3; depth about 1.50; eye 3.75 into length of head; D. XII 26; A. III 23. Snout rather produced, longer than diameter of eye. Scales 6-29-16. The black ocular band beginning at a distance equal to the length of the first dorsal spine anterior of the base of dorsal fin, and extending through the eye to isthmus, the lower part broadest. Teeth setiform. Fins: Posterior of dorsal and anal rounded. Dorsal spines stout and slightly curved; the median ones are longest. Caudal square, pectorals and ventrals are about equal length. Color whitish with two dusky bands about as wide as the length of caudal fin. These black bands extend from the dorsal to half-way down the sides of the fish, where they end indistinctly; the first from 1–5 spinous dorsal, the second from 8–12 spinous dorsal. Posterior of this last black line the color is a bright yellow, including all the soft dorsal, caudal and anal. The caudal peduncle has a round black spot near the middle. The caudal has a narrow black intermarginal band of white; the soft anal has two. There are about 19 subcutaneous, narrow, blackish, oblique lines passing down the body. Variations: This species is undoubtedly subject to a large amount of variation. In Garrett's "Fisches d. Sudsee" the two dark vertical bands from the dorsal are conjoined superiorly and extend so far as the fourth dorsal spine, and end sharply on about the middle of the sides, *i. e.*, on a line with snout and middle of caudal peduncle. And the body bands sometimes have white edges. In Day's "Fishes of India" these black bands are less wide and extend only to about the lateral line, while the caudal peduncle has a complete black band. Only one specimen was secured. Length 4.50 inches. Coral reef, Guam, May 29, 1900. *Hab.* Sea of Batoe, Seas of India to Malay Archipelago, Marianas.

### 177. **Chætodon strigangulus** (Solander). **Sea Butterfly.**

Head 3.20; depth 1.75; eye 3 into length of head; D. XIV 15; A. III 18. Scales 26 in the lateral line. Fins: Pectorals, ventrals, anal and dorsal white; the latter two tinged with yellowish and tipped with black. Caudal black, tipped with white, through which runs a fine black line. Mouth small, teeth minute. Color: Body whitish with about twenty-five black stripes angularly bent, with the angle pointing forward. A black ocular band, edged with white, not quite so broad as eye. One specimen, 4.50 inches in length, was secured inside the reef. Guam, July 14, 1900. *Hab.* From the Red Sea to Polynesia, Marianas.

### 178. **Chætodon trifasciatis** Quoy & Gaim.

Head 3; depth 1.75; eye 3.50, 1 into snout; interorbital 2.75; D. XIV 17; A. IV 16; V. I 5. Scales 9-37-14. Body moderately elevated and strongly compressed. The snout rather sharp-pointed. Lower edge of preopercle serrated. Branchiostegals 6. Teeth setiform. The dorsal spines are of moderate strength, the longest spine 1.75 into head. Pectorals and ventrals of about equal length, 1.60 into head. Color in spirits: Yellowish white, with about 15 rather indistinct oblique dusky lines, angularly bent, with the angle directed forward. The black ocular band edged with white of about the same width as eye, extends from the neck to chest, forming a complete ring. A black band, slightly wider than eye, covers all the soft dorsal and extends down to posterior part of soft anal; this band is anteriorly margined with white. The fins are white, the caudal with a wash of yellow, a narrow black line near the middle. Only one specimen, 2 inches in length, was taken. Guam, July 14, 1900. This species is well figured in Freycinet, "Voy. Uranie," Zool., Pl. 62, Fig. 6. *Hab.* Polynesia, Marianas.

## GENUS **HENIOCHUS** CUVIER & VALENCIENNES.

### 179-180. **Heniochus chrysostoma** (Solander).

Head 3; depth 1.40; D. XII 23; A. II 18; eye 2.75. Scales small, about 67 in the curved lateral line. Fins: Dorsal with fourth spine elongated into a filament almost as long as depth of fish. Pectorals white, reaching to middle of black band on body. Ventrals black, reaching to base of anal. Caudal square, white with dusky spot at base. Soft dorsal white, soft anal mostly black. The snout is short and sharp-pointed, mouth small, teeth villiform in jaws. Color: Yellowish white, with three broad oblique bands of black. The first black band extends from the front of orbit and near first dorsal spine, obliquely down to base of ventral fins and near to anus; the second black band extends from the 3–7 dorsal spines to third and the last soft rays of anal; the third black band extends from about the ninth dorsal spine along the base of soft dorsal to the base of caudal. Snout dusky. Length 3.50 inches. Several specimens were taken inside the coral reef, near Agaña, Guam, July, 1900. *Hab.* Indian Archipelago, Polynesia, Marianas.

## FAMILY **ZANCLIDÆ**.—MOORISH IDOLS.

## GENUS **ZANCLUS** CUVIER & VALENCIENNES.

### 181-188. **Zanclus canescens** (Linn.). **Ababang. Butterfly-fish.**

Head 2.45; depth about the same as length; eye 2.50 into snout; D. VII 37; A. III 35. A frontal horn above each orbit in adult specimens. Snout produced, teeth slender and brush-like, much projected. The anterior rays of dorsal and anal elongated. First and second dorsal spines very short; the third greatly produced, ending in a filament about as long as the fish. Pectorals about equal in length to the ventrals. Caudal peduncle unarmed. Fins: Caudal lunate. Pectorals about equal to length of snout. Ventrals (including filament) about the same length as anal. Colors: Yellowish white with three broad, dark, vertical bands, the anterior one forming a somewhat oblique line with anterior of orbit to second dorsal spine, and extending to midway between pectorals and anal; the second extends from the bases of 5–25 anal rays to about 8–23 dorsal rays; this dark band broadens out on the anal fin, while on the dorsal it contracts to a point; there is also a narrow line of white in the posterior part of this dark band; the third dark band includes the base of caudal peduncle and about all of caudal fin. The anterior one of these broad black bands is traversed by two more or less distinct narrow blue lines; in larger specimens these are almost obsolete, excepting the line which extends from anterior base of pectorals to the gill openings. A dusky stripe extends from the /\shaped narrow blue line above and on a line with the middle of orbit to the tip of the snout; half-way between orbit and tip of snout a black line branches off on each side from this dusky frontal band, and unites with two other dark lines given off near the premaxillary, to form a right-angle triangle on each side of the snout. Lower jaw mostly black. Eight specimens, from 2.75–5.25 inches in length, were secured inside the coral reef. Agaña, Guam, July 15, 1900. *Hab.* This is a common and wide-ranging form extending from East Indies and Polynesian islands to Revillagigedo Archipelago on the east to western Pacific, Marianas.

### 190. **Holacanthus cyanotis** Günth. **Ugupa Amrilla.**

Head, exclusive of flap, 4; depth 1.86; eye 3.50; the preopercle spine smooth, slightly curved, reaching to base of pectorals, 2 into head; interorbital equal to eye; snout 2 into head; D. XIV 15; A. III 16; V. I 5. Scales 48. Preopercle serrated, the strong spine at its lower angle directed back. Teeth setiform. Branchiostegals 6. Scales small, and mixed with these are many minute ones. Body elevated and strongly compressed. Fins: Caudal rounded. The spinous dorsal commences above the opercles. The pectorals and ventrals each equal to length of head. Soft dorsal and anal sub-angular posteriorly. Color in life: Yellow; a fine blue ring around the eye and across interorbital; a blue line, as wide as pupil, down the posterior edge of opercle. Fins yellow; dorsal, caudal and anal with a fine marginal line of deep bluish black. In spirits the color fades into a uniform yellowish white with a blue line around eye and down posterior margin of opercle; caudal, soft dorsal and anal with a fine marginal line of black. Two specimens. Length 5 inches. Guam, June 14, 1900. *Hab.* Polynesia, Marianas.

## GENUS **HOLACANTHUS** LACÉPÈDE.

### 191. **Holacanthus imperator** (Block.).

Head 4; depth 1.75; eye 3.36, about equal to width of interorbital space; D. XIV 20; A. III 19. Preopercle serrated and armed with a spine which in adults is almost a third longer than width of opercle. Teeth setiform in closely set rows. Fins: The dorsal spines short, the longest about equal in length to the base of pectorals. Posterior of anal, dorsal and caudal rounded. All the fins black, except the caudal which is yellowish. The vertical edge of dorsal is also tipped with yellowish. The anal is edged with a narrow line of blue, and a blue line runs out on the spine of the ventrals. Color dusky blue, with about 14 yellowish lines passing obliquely upward to the dorsal, or horizontally to the caudal, or the anal; these stripes are about one-fourth as wide as the interorbital space, and the ones passing to the dorsal are most oblique. A large black descending band, with a blue anterior edge, on the shoulder. Another black band of almost equal width, and edged all around with blue, occupies the interorbital space, passes over eyes and comes to a sharp point on the preopercle just above the spine. The opercle is yellowish brown with the above mentioned blue lines bordering it fore and aft. Length about 6 inches. Specimens were secured inside the coral reef near Agaña, Guam, June 14, 1900. *Hab.* East coast of Africa, through seas of India to Malay Archipelago, Marianas.

### 192. **Holacanthus marianas** sp. nov.

Head 3.50; depth 1.50; eye 2.75; maxillary 3.50; interorbital 3.20; D. XIV 20; A. III 19; V. I 5. Scales very small, feeling velvety to the touch. Body elevated and compressed. Head with moderately rounded profile, the snout but slightly projecting. Teeth setiform. Branchiostegals 6. Pseudobranchiæ well developed. Preopercle serrated, with a spine on lower part equal in length to the width of the opercle; this spine contained 3.50 times into head. Fins: Dorsal spines of moderate strength, the longest spine 2 into head. Posterior of dorsal and anal rounded. Caudal 1.16 into head, its posterior margin rounded. Pectorals the same length as head, the width of base 3. Ventrals with second ray produced into a short filament. Color in spirits: Bluish black, with about 13 more or less complete yellowish lines; the anterior of these lines, beginning at the base of the eighth dorsal spine, curves forward forming a margin of the jet black area of shoulders and then curves back to the anal opening; the remaining yellow lines above the axis are almost horizontal; the lines below the axis are very oblique, extending downward and back. Three of the lines on the axis are incomplete, being shorter than the head. There is a black area, the width of the eye, on the shoulders forming a line slightly above the eye to the pectoral fins; this area is bounded anteriorly by a blue line which extends down the middle and lower edge of the opercle. A black area, margined with blue lines across the forehead and over eyes like a mask; this black area, however, does not extend down on preopercles, as in *H. imperator*, but the blue borders unite directly behind the eye and send a vertical blue line down to the base of the opercular spine. Four narrow oblique blue lines on the thorax, and also a short blue cross line just back of isthmus. Anterior of these are blue lines running from near the base of opercular spine to the tip of the first ventral ray. A blue line over the nape midway between first dorsal spine and black area of forehead. Spinous dorsal and anal yellowish white; soft dorsal blackish, the yellowish body lines forming a few reticulations in the posterior part of the fin. Pectorals, ventrals and anal blackish, the anal narrowly margined with blue, and with about three blue lines running through it, forming reticulations in posterior part. This species is closely related to *H. imperator* (Bloch.), but differs markedly from specimens of that species before me in the shorter head and shorter preopercular spine, and the almost entirely different markings of the body. One specimen. Length 4.50 inches. This species was taken inside the coral reef, Agaña, Guam, July 14, 1900. Type specimen is No. 193 in the B. P. B. M. *Hab.* Marianas.

### 193. **Holacanthus nicobariensis** Bl.

Head 3.50; depth 1.50; D. XIV 20; A. III 19; eye 3.5 into head, same as width of interorbital space. Preopercle serrated and armed with a spine which is equal in length to the width of the operculum. Teeth brush-like, much produced. Snout concave. Fins: The posterior part of dorsal, anal and the caudal rounded; dorsal continuous. Pectorals 1.16 into length of head, their bases black crossed by one crooked blue line. Ventrals I 5, the first ray produced into a short filament. Color: Black with curved, concentric alternating white and blue lines; four of these white lines are especially wide and distinct, *i. e.*, one running obliquely forward just posterior to the eye—this touches the base of the preopercle spine and runs out on the spines of the ventrals. The second crosses the vent, curves up along sides of body, runs along the base of the dorsal and ends in reticulations on the posterior part of this fin. The third strongly marked white line extends in a deep crescent from posterior base of dorsal to posterior base of anal fin. The fourth and broadest line forms a complete circle around a short straight white line just anterior of caudal peduncle. In addition to these heavy white lines there is a lighter white line midway between each of them, and on each side of these narrow white lines and midway between them and the heavy white lines, are narrow concentric lines of blue. So, for example, beginning with the heavy white line which crosses the vent, we have first the heavy white line; second, a narrow blue line; third, the light white line; fourth, a narrow blue line; and fifth, the heavy white line again. This is the uniform pattern of the fish; however, the blue lines may be more or less irregular, and between the two posterior heavy white lines they are incomplete, the last one being reprerented merely by three blue dots. There is a white cross band on the forehead with a narrow blue line above it. A white spot between nostrils. A bluish line running vertically down the cheeks makes an acute angle in front of eye and extends down the snout. A short blue line from gape to branchiostegals. Reticulations of bluish white on posterior part of dorsal and anal. Caudal dusky, with two white bands at base, and two irregular white bands on caudal peduncle. Length 4.50 inches. Specimens taken agree perfectly with Garrett's figure, "Fisches d. Sudsee," p. 41. *Hab.* Seas of India to Malay Archipelago and beyond, Red Sea, east coast of Africa, Marianas. My specimens were secured among the coral reefs of Guam, May 25, 1900.

### 194. **Holacanthus bishopi**[5] sp. nov.

Head 3.66; depth 1.66; eye 2.50, 1 into snout; interorbital 3 into head; D. XIV 19; A. III 21; V. I 5. Scales minute and feel like velvet to the hand. Body elevated, strongly compressed; the snout not produced. Hind margin of preopercle finely serrated, the spine equal in length to diameter of eye. Branchiostegals 6. Pseudobranchiæ present, teeth setiform. Fins: Dorsal spines rather short, the first spine 3.66 into head, the second about as long again. The pectorals are the same length as head, their bases 2.50 into head and equal to preopercular spine; the first ray of pectoral prolonged into a small filament, length 3 into total length of fish. The hind margin of dorsal, caudal and anal rounded. Color in spirits: Black with about 8 concentric bluish white lines, alternately rather wide and very narrow as follows: First, as wide as pupil, forms a circle around snout and anterior edge of preopercle; second, encircles nape, passes just in front of preopercle spine, extends obliquely back on thorax and out on the first ray of ventrals; third, a narrow stripe forms a circle just in front of dorsal spine, crosses base of pectorals and around the belly just back of the ventrals; fourth, a wide line forms reticulations on soft dorsal, curves forward to almost a line with pectorals and then encircles belly at the vent; fifth, a narrow line extends from soft dorsal, forms a half-circle and ends in reticulations on posterior of anal fin; sixth, a wide line extends as a circle from posterior edge of dorsal to posterior edge of anal; seventh, a narrow incomplete half-circle; eighth, a wide line forms a complete circle just in front of caudal peduncle. In addition to these markings there is a narrow blue line extending perpendicularly down from front of eye to edge of opercle; another across the interorbital space, and another between the nostrils. A simple reticulation of blue lines on the base of caudal fin. The fins are all dark, the caudal with a slight wash of yellowish. This species differs from the *H. nicobarensis*, Bl., before me in its shorter head, longer spine, larger eye, and additional soft dorsal ray, one less anal ray, and the markedly different arrangement and number of the body markings. Length of specimen 3.50 inches. Agaña, Guam, July 14, 1900. Type specimen is No. 194, B. P. B. M. *Hab.* Marianas.

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[5] Named in honor of Charles R. Bishop, founder of the Bernice Pauahi Bishop Museum.

## FAMILY **TEUTHIDIDÆ.**—SURGEON-FISHES.

### GENUS **TEUTHIS** LINNÆUS.

### **195. Teuthis olivaceus** Bl.

Head 3.50, the profile rounded—the snout, however, is straight; depth 2; eye 3.20 into head; D. IX 24; A. III 22; V. I 5. Scales minute, ctenoid, about 20 between lateral line and dorsal. Teeth: Sixteen broad flat teeth in the upper jaw, dentate at extremity; about 14 in lower. Color: Dark brown; extending longitudinally backwards from the upper articulation of the opercle is a bright cadmium orange line (bluish in spirits), about equal in length to the snout, and half as wide as the interorbital space. This blue line is surrounded by a black zone of about the same width. There is a blue splotch just posterior to base of pectoral fins; this splotch is completely hidden by the pectorals when they are pressed against the sides of the body. The general color of fins is brown. The pectorals are broadly edged posteriorly with bluish white. The ventrals have a trace of blue. The caudal fin is deeply lunate, the upper lobe the longer; color entirely black, except the soft rays of the middle, which have a broad subterminal band of white, with a narrow terminal line of black. Caudal peduncle entirely brown, with one movable spine which is equal in length to the width of the eye. The pectoral fin is equal in length to the head. The ventrals are considerably shorter. The posterior edge of dorsal and anal form acute angles. One specimen, length 6 inches, was secured inside the coral reef, Agaña, Guam, July 15, 1900. *Hab.* Polynesia, Marianas.

### **196. Teuthis mata** Cuv. & Val.

Head 3.50; depth 1.88; eye 3.50, 2 into snout; interorbital 3 into head; D. IX 26; A. III 25; V. I 5; P. 16. Scales minute. The spine on side of caudal peduncle short, about equal to one-half the width of orbit; it is less than one-half the depth of the caudal peduncle. Body compressed, elevated. The snout is straight; the mouth is small, with about 9-10 elobate teeth on each side of either jaw. Fins: The caudal is emarginate—the upper lobe the longer—the outer rays somewhat prolonged, 2.50 in length. The pectorals are equal to length of head. The ventrals are shorter, 1.33 into head. Posterior margins of anal and dorsal form acute angles. Color in spirits: Uniform dark brown; fins all black, except posterior two-thirds of pectoral which is yellowish white. Iris yellow with inner ring of black. In the young the pectorals are colorless. Five specimens, 2–7 inches in length, were taken inside the reef at Agaña, Guam, June 9, 1900. *Hab.* Western Pacific, Polynesia, Marianas.

### 197. **Teuthis triostegus** (Linn.).

Head 3.66; depth 2; eye 3.66; interorbital 3; D. IX 22; A. III 19; V. I 5; P. 15. Scales minute. Body ovate, compressed. Anterior profile curved, most convex over eye. Mouth small with about seven wide lobate incisors on each side. Fins: Dorsal with anterior spines more or less concealed in the skin. Caudal emarginate, the upper lobe slightly the longer. Color in spirits: Yellowish white with a wash of green, under surface white. Vertical fins dusky, pectorals white with yellow wash. Anal has a narrow margin of white. Body with five black vertical bands about as wide as pupil; first, from top of head through eye to branchiostegals; second, from base of first dorsal spine to base of pectorals where it branches, one branch going obliquely forward and down towards the isthmus, the other branch obliquely back and down to about ventrals; third, band from sixth dorsal spine to belly between anus and anal fin; fourth, from first dorsal ray to first anal ray; fifth, from seventh dorsal ray to fifth anal ray. A short black line over top of caudal peduncle, and a black dot on each side below. There is also a black line down the middle of snout. Eight specimens. Length 2–6 inches. Guam, May 26, 1900. *Hab.* Polynesia, Marianas.

### 198-204. **Teuthis lineatus** Bl. **Hijug.**

Head 4; depth 2; eye 3–3.50 into head; profile rounded, the snout, however, below the nostrils, is almost straight; D. IX 28; A. III 27; P. 17. Scales: About 8 rows between the lateral line and the base of the dorsal. Ground color of the sides and back canary yellow, with seven slightly oblique lines, blue in middle with dark on each side; these lines extend back to root of caudal fin. Lower part of body and belly grayish. A blue line passes down the middle of the forehead to the maxillary where it divides and forms a ring around the mouth; two other blue lines extend down on each side of this mid-line of the forehead; two or more blue lines begin on each side, just in front of the orbit, and curve down the sides of the snout to opercles. Other blue lines pass up and back from the hind edge of orbit to the lines of the body. Teeth flat, with dentate edges, 12 in each jaw. Fins: Ventrals with the longer outer ray blue, inner ones yellowish. Pectorals bluish.

Dorsal, anal and caudal dark, the dorsal with three or more blue lines running through it and terminating at the acute posterior angle of the fin. The anal has a narrow subterminal line of black, while tip of fin is bluish—the posterior part forms an acute angle. Caudal fin deeply lunate, the upper lobe the longer. There is a semi-lunar blue band about the middle of the caudal. Caudal peduncle strong, and armed with one white movable spine, considerably longer than the width of the eye. Variations: In spirits the bright canary yellow ground color fades into a dirty white. Guam specimens show a considerable variation in the arrangement of the blue lines about the base of caudal fin. They also fail to show the concentric arrangement of the blue lines in the dorsal fins as figured in "Fisches d. Sudsee," Vol. I., Haft IV. Seven specimens, length 4–11 inches, were taken inside the reef, Agaña, Guam, July 9, 1900. *Hab.* Polynesia, Marianas.

### 205. **Teuthis aliala** Linn.

Head 3.66; depth 1.50; eye 3.50; interorbital 3; D. IX 29; A. III 27; V. I 5; P. 16. Scales minute. Body elevated and compressed. Snout slightly concave; jaws with 5 elobate teeth on each side. Caudal peduncle about equal in height to length of its spine. Branchiostegals 5. Pseudobranchiæ developed. Fins: Caudal lunate, its longest ray 3.50 into length of fish. Pectorals equal to length of head; the ventrals are about one-third shorter. The posterior margins of the dorsal and anal are rounded. Color in spirits: Blue-black, a sub-crescentic area of Indian red just below the eye. A white ring around mouth. A line of yellowish white along the bases of anal and dorsal; posteriorly these lines broaden out and occupy about a third of the fins. Caudal is yellowish white with a white band and a black posterior margin. Spine on free portion of tail yellow. Pectorals and ventrals black. Dorsal and anal black, excepting the yellowish white marking mentioned above. Twelve specimens, one 7 inches in length, the others (very young) 1–2 inches in length. Agaña, Guam, July 14, 1900. *Hab.* Western Pacific, Polynesia, Marianas.

## GENUS **CTENOCHÆTUS** SWAINSON.

### 206. **Ctenochætus strigosus** Bennett.

Head 4; depth 2; eye 3.50 into head; D. VIII 30; A. III 27; V. I 5. Scales small, about 19 between lateral line and the base of the last dorsal spine. Teeth setiform, movable with their outer end dilated and bent in and notched; 42 in upper row, 46 in lower. Color in spirits: Brown, faint traces of slight blue lines under the pectoral fins. Fins all black, except pectorals which are slightly yellowish blue. Caudal deeply lunate. The posterior parts of dorsal and anal not rounded, but forming very acute angles. Caudal peduncle stout and armed with movable black spine 1.30 times as long as width of eye. Probably *A. ctenodon*, Cuv. & Val., should stand for this fish, as such a marked increase in the number of teeth and scales, if fixed characters, would give it specific rank. Two specimens were taken. Length 1.50–6 inches. Guam, July, 1900. *Hab.* Polynesia, Marianas.

## GENUS **ZABRASOMA** SWAINSON.

### 207-210. **Zabrasoma guttatus** Forst. **Hamoktan.**

Head 3.50; depth 1.50; eye 3.50, 3 into snout; interorbital 2 into snout; D. IX 28; A. III 23; V. I 5; P. 15. Scales very small, about 120 in lateral line. Body elevated and compressed. Snout slightly concave, each jaw with six deeply lobate incisors on each side. Branchiostegals 5. Pseudobranchiæ present. Fins: Caudal sub-truncate, the longest ray equal to length of pectorals, 3.33 into length of fish. Caudal peduncle high, about 2 into head, the spines about equal to one-half the height of the peduncle. Color in spirits: Brownish with two bluish white cross bands on the body and one on the shoulders extending down on opercles. These bands are slightly oblique, the first and second (measured on the median line) are about half as wide as eye; the third is narrow. The posterior two-thirds of the fish, including dorsal and anal fins are covered with numerous round whitish dots about the size of the pupil; these dots are blue in life. The thorax and ventrals are bluish white. The anterior half of caudal is yellowish white shading into dusky on posterior edge. Pectorals yellow. Four specimens, length 6–8 inches, were taken at Agaña, Guam, June 28, 1900. *Hab.* Western Pacific, Marianas.

### 211. **Zabrasoma agaña** sp. nov.

Head 3; depth 1.66; eye 3, 2 into snout; interorbital 3.33, equal to eye in specimens 4 inches long; D. V, 25; A. III 20; V. I 5. Scales minute, rough. Body very much compressed and elevated. Snout concave and somewhat produced. The caudal peduncle is equal in height to width of eye, and is one-third longer than the spine, which is white. The mouth is small; there are about 9 lobate teeth on each side of upper jaw. Branchiostegals 5. Pseudobranchiæ present. Fins: Caudal almost square, but the upper edge is a little the longer; the longest ray 4 into length of fish without caudal. The pectorals are equal in length to head, and about one-third longer than the ventrals., The posterior angles of dorsal and anal are rounded. Color in spirits: Yellowish; fins all similar in color; in some specimens the fins are a little brighter yellow. A white streak, one-half as wide as eye, extends back on the median line from near posterior edge of opercle to about on a line with base of tenth soft dorsal ray. Seven specimens, 2–4.50 inches in length, taken at Agaña, Guam, June 14, 1900. *Hab.* Marianas. Type is No. 211, B. P. B. M.

### GENUS **SIGANAS** FORSKÅL.

### 212. **Siganas marmorata** (Quoy & Gaim.).

Head 4.33; depth 2.33; eye 3.33, equal to maxillary; interorbital 3.66; D. XIV 10; A. VII 9; V. I 3 I. Scales minute. Branchiostegals 5. Pseudobranchiæ well developed. Body oval, strongly compressed. Snout rather blunt and rounded; upper jaw somewhat overhanging. Teeth: A single row of cutting incisors in each jaw. Fins: Dorsal spines strong, the fourth the longest, its length equal to distance from the first vertical spine. Caudal only slightly forked, its longest ray equal to head; first ventral spine 1.33 into head, reaching more than half-way to anal. Color in spirits: Brown with wash of bluish; head and back covered all over with blue vermiculated lines which are wavy and longitudinal on the sides. Caudal, dorsal and anal with brownish lines. Pectorals yellow. Two specimens. Length 3–7 inches. Agaña, Guam, May, 1900. *Hab.* Western Pacific, Marianas.

### 213. **Siganas hexagonata** Günth.

Head 4; depth 2.20; eye 3.50; interorbital 3; D. XIV 10; A. VII 9; V. I 3 I. Scales distinct but small. Body oval and compressed; profile slightly convex. Maxillary equal to diameter of orbit, 3.50 into head, its distance from orbit equal to its length. Teeth: A single row of cutting incisors in each jaw. Branchiostegals 5. Pseudobranchiæ well developed. Caudal peduncle much compressed, its height 3 into head. Fins: Caudal deeply forked, its upper lobe slightly the longest, 3.20 into length of body; the depth of fork 1.50 into head. Soft dorsal and soft anal about equal in height and length; the longest ray of dorsal is 1.66 into head. Pectoral 1.25 into head, its base a little greater than diameter of orbit. Color in spirits: Blue with yellowish spots about one-half the diameter of pupil in size all over the body and head. These golden spots have narrow margins of black, outside of which the blue ground color shows in more or less hexagonal form. Dorsal, caudal, anal and ventral dusky bluish. Pectorals yellowish. Length of above specimen 13 inches. Four small *Teuthis* length 4–5 inches, which I take to be the young of this species, were captured at the same time. These show very indistinct hexagonal markings, and the general color is a much lighter blue with from 8–12 round black dots, one-half the size of pupil, scattered over the sides of the body. There is also a black opercular splotch on the upper posterior margin of opercle. The caudal is deeply forked. Head 4; depth 2.50; eye 3; interorbital 3. Agaña, Guam, July 12, 1900. *Hab.* Polynesia, Marianas.

### 214-215. **Siganas rostrata** Cuv. & Val.

Head 4.50; depth 3; eye 3.25; interorbital 3.20; D. XIV 10; A. VII 9; V. I 3 I. Body oval and compressed. The dorsal and abdominal profiles are equally convex. Mouth is rather small; the maxillary is contained about 4 into head, its distance from the anterior edge of orbit is one-half its length. Teeth: A single row of cutting incisors in each jaw, about 18 on each side of upper. Branchiostegals 5. Pseudobranchiæ well developed. Fins: The caudal is deeply forked, its upper lobe a little the longest, 3.66 into length; the depth of the fork is 1.20 into head. Caudal peduncle unarmed, its height is 4.50 into head. Soft dorsal and soft anal of about equal length, but the dorsal is a little the highest; its longest ray is contained 2 into length of pectorals. The base of pectorals equal the diameter of eye. Color in spirits: Bluish, the body covered with indistinct mottlings of yellowish spots and lines, wider than the interspaces of blue ground color; lighter blue on belly and thorax. The caudal in one specimen seems to be a uniform dusky bluish; in the other there are indistinct blotches of yellowish. Pectorals are yellowish, ventrals bluish; dorsal and anal dusky, the webs more or less yellowish white. Two specimens, length 10–11 inches. Guam, July 12, 1900. *Hab.* Western Pacific, Polynesia, Marianas.

### GENUS **MONOCEROS** BLOCK.

### **216-221. Monoceros garretti**[6] sp. nov.

Head 3.50; depth 2; eye 3.50, 2 into snout; D. VI 28; A. II 29; V. I 3; P. 16. Scales minute, rough. Body elevated and compressed. Two bony plates on the caudal peduncle with short, sharp keels. The yellow covering of the base sharply defined and separated by a black line. The snout is concave, but the profile is more rounded than in *M. lituratus*. The distance from base of first dorsal to the upper nostril is 1.33 into head. Mouth is perfectly horizontal on the median line. Teeth: A single series of sharp, compressed incisors, not serrated, about 10 on each side of upper jaw. Branchiostegals 4. Pseudobranchiæ developed. Fins: The height of the fourth dorsal spine equal to length from its base to anterior base of first dorsal spine. The first dorsal spine 2 into head. The caudal fin is emarginate, the upper lobe slightly the longest, its length 4.20 into height. Longest ray of pectoral 1.50 into head, its base 4.88. Longest ray of ventrals about equal to pectorals. The posterior margins of dorsal and anal forming acute angles. Color in spirits is a uniform lamp-black with a slight wash of neutral. There is a narrow yellowish green line extending down each side the snout from anterior of orbit to form a more or less complete circle on the lips. Two round yellow spots on caudal peduncle forming the bases of the keels. The caudal is black with a sub-terminal band of yellow, and a marginal band of white. The dorsal is black with a sub-marginal line of white which begins very narrow and gradually widens posteriorly to half the width of the fin; there is a narrow margin of black above this. There is no colored line at base of dorsal, as in *M. lituratus.* The anal fin is greenish, with a narrow black margin and the inner third with a wash of brown. Pectorals and ventrals brownish. This species is closely related to *M. lituratus* (Forst.), but differs in having a more rounded profile, a decreased number of dorsal and anal rays, a much darker general coloring, without a yellow line at base of dorsal, and with two distinct yellow spots on caudal peduncle separated by a sharply defined black area. These color markings are fixed and distinct in the entire series. This is undoubtedly the fish figured by Mr. Garrett in "Fisches d. Sudsee," Tafel 28, but it is not the fish described in the text, Vol. I., p. 124, which is a good description of *Monoceros lituratus* now before me. I have carefully compared a series of these two species of the same size and age, and as the differences stated above hold good, even in the details of the markings, I cannot put them under one species. Quoy & Gaimard, description and figure, will not fit either of these species, and I think their species should stand *M. carolinarum*, Quoy & Gaim., until the fishes of the Caroline Islands are better known. Their type specimen was eaten, and the figure may be approximately correct. Six specimens, length 3–6 inches. Agaña, Guam, July, 1900. *Hab.* Polynesia, Marianas. Type of species is No. 216, B. P. B. M.

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[6] Named after Andrew Garrett.

### 222-223. **Monoceros annulatus** (Quoy & Gaim.).

Head 4; depth 2.33; eye 2.66; interorbital 3; D. VI 27; A. II 28; V. I 3. Scales minute, rough. Body compressed and elevated. Forehead with a short projecting horn, situated below the level of the centre of orbits. In specimens 6.50 inches in length the tip end of this horn is equidistant from the orbit and teeth of upper jaw. Its length, measured from the orbit, 2.33 into head. Teeth small, finely serrate on inner side. The profile from first dorsal spine to tip of snout is slightly convex. Caudal plates absent in young; in specimens 6 inches in length are scarcely visible, and are entirely unkeeled. Color in spirits: Uniform light grayish brown, lighter on the caudal peduncle. Fins dusky, the caudal greenish yellow on the posterior half. Two specimens. Length 4–6.50 inches. Agaña, Guam, July, 1900. *Hab.* Western Pacific, Marianas.

### 224. **Monoceros lituratus** (Forst.).

Head 3.50; depth 2; eye 3.25, 2 into snout; D. VI 30; A. 30; V. I 3; P. 16. Scales minute, rough. Body elevated and compressed. Two bony plates on caudal peduncle with short, sharp keels—the yellow coloring of the bases intermingling. The distance from the base of first dorsal spine to upper nostril is 1.33 into head. The mouth is perfectly horizontal on the median line. Teeth: A single series of compressed incisors, 10 on each side of upper jaw. Branchiostegals 4. Pseudobranchiæ developed. Fins: The height of the fourth dorsal spine a little greater than the distance from its base to anterior base of first dorsal, the first dorsal spine about 2 into head. The caudal emarginate, the upper lobe slightly longer, its length 4.20 into length of fish. Longest ray of pectoral 1.33 into head, its base 4.25. Longest ray of ventrals 1.66 into head. Color in spirits: Light brown with a wash of grayish; a greenish streak, beginning at anterior edge of orbit, descends in a curve along sides of snout to angles of the mouth. Back with a blue line along base of dorsal fin. The interorbital space is crossed by a green band about half as wide as eye; this band crosses forehead and curves back over orbit to near top of opercles—in specimens long in spirits this green interorbital marking is apt to be faded out. The sides of caudal peduncle are yellow without a black area between the two spiny plates. Dorsal black with a white line beginning narrow in front, broadening posteriorly to half the height of the fin; above this is a narrow terminal line of black. Anal greenish white margined with a narrow line of black, the inner third without the conspicuous wash of brown seen in *M. garretti*. Pectorals and caudal brownish, the latter with a green and white margin posteriorly. Three specimens, length 5 inches. Agaña, Guam, July, 1900. *Hab.* Polynesia, Marianas.

### 225-227. **Monoceros marginatus** Cuv. & Val. **Taloga.**

Head 3.66; depth 2.33; interorbital 3.50; eye 4.50, 3 into snout. Forehead with a short horn-like prominence projecting forward directly in front of eye. In specimens 11 inches in length this horn is about three-quarters of an inch; measured from the orbit to tip it is 3 into head; in younger specimens it is shorter, and is entirely absent in specimens three inches in length. D. VI 29; A. II 28; V. I, 3. Scales minute, rough. Mouth perfectly horizontal; about 15 small sharp teeth on each side of upper jaw, about 12 on each side below; these teeth are minutely serrated on their inner side. Branchiostegals 4. Pseudobranchiæ well developed. Caudal peduncle with two sharply keeled bony plates with blue bases, absent in young. Fins: The caudal is broad and emarginate, the upper ray the longest, being equal to length of head. The dorsal has its origin directly above the posterior line of the head; its spines and rays are markedly triangular in transverse section, the first spine the longest, 1.66 into head. Ventrals are short, 2 into head. Pectorals 1.33 into head, their bases equal to eye. Color in spirits: A dirty bistre olive, slightly lighter below, dorsal and anal slightly darker with a narrow black margin. Anal with from 1-3 longitudinal lines. The caudal and pectorals with a more decided wash of yellowish, and with lighter margins. Five specimens, length 3–11 inches. Agaña, Guam, July 14, 1900. *Hab.* Western Pacific, Marianas.

## FAMILY **BALISTIDÆ.**—TRIGGER-FISHES.

### GENUS **BALISTES** (ARTEDI) LINNÆUS.

### 228-229. **Balistes undulatus** Mungo Park.

Head 3; depth 2.25; eye 5.50; interorbital 4.50; D. III, 28; A. 24. Scales 31, in series from base of spinous dorsal to vent, about 48 in lateral line. Caudal peduncle with 6 strong spines on each side, arranged in a double row—sometimes with an extra spine on one side. Color in spirits: A lamp-black; head and body with about 15 oblique or undulating lines of yellowish (reddish in life) about as wide as pupil; a broad line comes from each lip and, uniting about on a line with the eye, extends back to a little past and below the pectorals; another very distinct red line, just above this, extends from the upper lip to anus; a yellow line around lower lip; thorax black, without markings; spinous dorsal black; pectorals, anal and soft dorsal yellowish, the rays dusky at base; rays of caudal dusky, the membrane yellow, the fin white at tip. Two specimens. Length 7 inches. Guam, July 13, 1900. The markings of this species are very well shown in Quoy & Gaimard's figure (Voy. Uran. Zool., p. 208, pl. 47, fig. 1), but the caudal peduncle is drawn much too thin. In the specimens examined the caudal peduncle is very short and high, its height 2.50 into head. *Hab.* Western Pacific, Polynesia, Marianas.

### GENUS **BALISTAPUS** TILES.

### 230-233. **Balistapus aculeatus** (Linn.).

Head 2.75; depth 2.50; eye 5.50; D. III, 25; A. 22. Scales 23, in a series from dorsal fin to vent. The caudal peduncle is armed with two and a half rows of sharp, curved spines with black bases. Fins: Caudal fin contained 6.5 times into length of the fish. Ventrals almost obsolete, represented by a single movable spine. Second dorsal and anal of moderate height. Pectorals short, about as broad as long, their bases black, the rays white. Scales rather large, some osseous scutes behind gill openings. Cheeks entirely scaled. Colors: Sides blackish, with two pairs of oblique whitish or yellowish bands descending from middle of sides to the anal fin. A broad black cross band between the eyes. Three blue vertical lines from the eye to the base of the pectorals. A yellowish band runs from the bases of the pectorals along the sides of the head to the snout; a brighter yellow line on premaxillary. Variations: One adult specimen has two extra spines on one side of caudal peduncle; these are just above the normal rows. The young are shorter and deeper, the head being 2.50 into total length, and the depth 2. A good series of specimens were secured, taken for the most part inside the reef, near Agaña, Guam, June, 1900. *Hab.* Western Pacific, Marianas.

### 234-237. **Balistapus rectangulus** Bl.

Head 2.66; depth 2.33; eye 6; interorbital 4; D. III 23; A. 21. Scales of medium size, entirely covering the cheeks; 4–5 osseous plates behind gill openings, three and one-half rows of recurved black spines on sides of the caudal peduncle; no groove in front of eye. Teeth notched and compressed, about 4 on each side of upper jaw. Fins: First dorsal spine very strong, 2.25 into head; caudal square; ventral spine movable. Color in spirits: Olive; belly, thorax and chin yellowish; a broad black band with lighter (bluish) edges over top of head through eyes, and widening as it extends obliquely back on sides of body to anas and anterior two-thirds of anal fin. Caudal peduncle encircled with black, which extends horizontally forward on the sides in the shape of an acute angle; this black is edged with lighter colored lines (yellow in life); a light yellow line passes from posterior base of soft dorsal horizontally forward to the big black line mentioned first; a narrow line extending down from anterior of orbit to a little in front of pectorals; the interorbital space is crossed by three narrow deeper black lines on the black field; webs of spinous dorsal and base of pectorals black; fins yellowish white. Four specimens, 4–6 inches in length. Agaña, Guam, June 28, 1900. *Hab.* Polynesia, Western Pacific, Marianas.

## FAMILY **MONACANTHIDÆ.**—FILE-FISHES.

### GENUS **AMANSES** GRAY.

### 238-241. **Amanses sandwichensis** Gray. **Paloman.**

Head 3.25; depth 2; eye 5; interorbital 3.50; D. I 36; A. 31. Scales minute, the skin velvety to the touch. Two pair of strong curved spines on each side the tail. Body elevated and compressed. Profile of snout slightly concave. Dorsal spine without barbs. Caudal fin rounded. Ventral spine not movable. Dorsal spine situated above anterior half of orbit. Color in spirits: A dirty light brown; the soft fins yellowish white; the dorsal spine brown; the caudal dusky with yellowish white on posterior part. Four specimens, length 4–12 inches. Guam, July, 1900. The young specimens do not have spines on the sides of the tail, and have the dorsal spine much rougher, with indication of two or three rows of barbules. *Hab.* Western Pacific, Marianas.

### GENUS **OXYMONACANTHUS** BLEEKER.

### 242. **Oxymonacanthus longirostris** Bleek.

Head 2.66; depth 2.66; eye 5; interorbital 4; D. I 35; A. 29. The sides of the caudal peduncle with brush-like setiform spines. Body oblong, compressed. The upper and lower profile about equally oblique; the snout much prolonged, upper profile concave, turned up at tip. Skin velvety. Mouth tubular, lips very thin. Gill openings small, situated on a vertical line a little posterior of orbit. Fins: The dorsal spine is of moderate strength, more or less rounded—not 4-edged; the middle of its base is directly (in line) above the pupil of the eye; its length is 1.50 into head, and it is equal to the distance from anterior margin of eye to posterior margin of lips. The barbs are small and more or less irregularly arranged, the most prominent being a row deflected downward on the back of the spine. The ventral spine is rather prominent, rough, fixed, with a thin abdominal membrane between it and belly. Caudal rounded, short, 2.25 into head. Ventrals 3.50 into head. Color in life: Blue, with yellow dots. In spirits: Light gray, with a slight wash of bistre-brownish. Seven longitudinal rows of round white spots about the size of the pupil extending from the head to tail; tip of snout white, followed by a narrow black ring; a line of white extends from near gape to a little below the orbit; another white line extends from the middle of sides of the snout to orbit. more or less white dots below the eye and on sides of the thorax; just above the ventral spines is a black splotch with numerous very fine white dots. Caudal fin brownish, white at tip, with an incomplete intermarginal black line half the width of eye. Dorsal, anal and pectorals white. Two specimens, length 4 inches. Agaña, Guam, June 14, 1900. *Hab.* Marianas.

## FAMILY **OSTRACIIDÆ.**—TRUNK-FISHES.

### GENUS **LACTOPHRYS** SWAINSON.

### 243. **Lactophrys nasus** (Bloch.).

Carapace, 5-ridged and spineless; P. 10; A. 9; C. 10. Color in spirits: Greenish yellow, with numerous black spots along sides. One specimen of a very young, length three-quarters of an inch, was secured. Guam, July 14, 1900. *Hab.* Seas of India to Malay Archipelago and western Pacific, Marianas.

### GENUS **OSTRACION** ARTEDI.

### 244. **Ostracion cubicus** Artedi.

Carapace, 4-ridged, without spines; D. 10; A. 9. The back slightly convex, no raised ridge on median line. Color in spirits: White with scattered round black dots all over the body. One specimen, length three-quarters of an inch. Guam, July 14, 1900. *Hab.* Red Sea, western Pacific, Australia, Marianas.

### 358-361. **Ostracion cornutus** (Linn.).

Head 3.50; depth (at hump) 2.50; eye about 2; interorbital very concave, 4 into length; frontal spines 5.50 into length; posterior spines about the same; D. 9; A. 9; P. 11. Scales: About 10 plates in a line between caudal and eye. Body shortened and angular, the carapace 4-ridged, with a small ridge in the middle of back. The hind portion of tail covered by soft skin. Mouth small, maxillaries and premaxillaries coalescent. Teeth rather slender and in one row, about 10 in each jaw. Color in spirits: Carpace bistre-brown, with numerous irregular and indistinct darker blotches; below yellowish. Four specimens, length 1.50–5.50 inches. Agaña, Guam, July 12, 1900. *Hab.* Western Pacific, Malay Archipelago, Marianas.

### 246-248. **Ostracion punctatus** Bl. **Danglum.**

Head 3.50; depth 3; eye 3, about 2 into snout; interorbital 1.12; D. 9; A. 9; C. 8; P. 10. Carapace 4-ridged without spines. Back somewhat rounded without any ridge in median line. Interorbital space almost flat. Teeth: About 10 conical brown teeth in each jaw. Fins: Caudal 4.50 into length. Pectorals 1.50 into head. Dorsal and anal slightly shorter. Color in spirits: Brown, with small blue dots all over the body; older specimens have few or no spots on snout, and the spots are larger on sides and belly. Fins are dusky, with black bases. Young specimens have bluish spots on caudal fin, while old specimens have the posterior third of fin white. Three specimens, length 3–6 inches. Guam, June 14, 1900. *Hab.* Polynesia, western Pacific, Marianas.

## FAMILY **TETRAODONTIDÆ.**—PUFFERS.

### GENUS **TETRODON** LINNÆUS.

### 249. **Tetrodon papua** Bl.

Head 2.66; depth 2.1; eye 5, 3 into snout; interorbital concave, 3 into head; D. 9; A. 10; P. 16; C. 10. Spines minute, covering the entire body, except caudal peduncle. Nasal organs quite inconspicuous. Back compressed into a ridge. Bones of the upper and lower jaw in the form of a beak, with cutting edge. A median suture present. Fins: Longest dorsal ray equal to longest anal ray, 2 into head; longest ray of caudal 3 into length of fish; the space between the hind margin of dorsal and the base of caudal 4 into length. Color in spirits: Above, a sepia brown covered with blue spots with black edges; these spots thicker and smaller than pupil, on the posterior half; on the sides of head the spots are as large or larger than the pupil; several short radiating blue lines about eye; three or four across interorbital space. Older specimens have blue lines over the snout and on sides of the mouth. Under parts yellowish white with a median blue line on belly to anal in larger specimens. A black spot, a little larger than eye, covering the base of dorsal. Pectorals, anal and dorsal fins yellowish white. Caudal dusky yellow with numerous blue lines and dots. Six specimens, 1.25–3 inches in length, were taken at Agaña, Guam, inside the coral reef, July 12, 1900. These fish are usually found in pairs swimming about the coral reef; it is even difficult to frighten them so the two will separate, and when this is accomplished they seem to invariably join the same partner again. *Hab.* Polynesia, Marianas.

### 250. **Tetrodon reticularis** Bl.

*Young:* Head 2.50; eye 3.50; caudal rays 4 into length of fish and equal to distance from caudal to anterior base of dorsal; pectorals 2 into head; small spicules all over except at base of caudal; interorbital 3.50 into head. Color: Back, head and cheeks brown, with scattered blue spots. Two blue concentric lines below eye. Base of pectorals black with one or two concentric bluish rings. Belly yellowish white with about 18 longitudinal brown lines about three times as wide as the interspaces. Caudal dusky. Pectorals, dorsal and anal yellowish. One specimen, a young, 1.50 inches in length, was the only representative of this species secured. Agaña, Guam, July 12, 1900. *Hab.* Western Pacific, Marianas.

### 251. **Tetrodon immaculatus** Bl.

*Young:* Head 2.33; eye 3.50 into head; length of caudal ray 3 into head; pectorals 3; interorbital 3 into head. Color in spirits: Brownish above with about 8 oblique narrow black lines extending up and back from vicinity of pectorals to caudal and dorsal; below yellowish white, unstreaked. Caudal dusky, with black upper and lower margins. Pectorals, anal and dorsal white. One specimen, length 1.50 inches, taken at Agaña, Guam, July 12, 1900. *Hab.* Polynesia, Marianas.

### 252. **Tetrodon stellatus** Bl.

*Young:* Head 2.50; eye 3; interorbital 4; caudal rays 3.50 into length; pectorals 3. Color: Almost a lamp-black above, unspotted; white below, with 16 very black longitudinal lines of about the same width as the interspaces. A brown ring around snout. A few small blue spots on caudal peduncle. A black splotch larger than eye at base of pectorals. One specimen, length 2.25 inches, from coral reef at Agaña, Guam, June 12, 1900. *Hab.* Western Pacific, Polynesia, Marianas.

## FAMILY **DIODONTIDÆ.**—PORCUPINE-FISHES.

### GENUS **DIODON** LINNÆUS.

### 253. **Diodon hystrix** Linn. **Porcupine-fish.**

Head 3; depth 3.33; D. 15; A. 14. Spines strong; the spines behind the pectorals longest and strongest; frontal spines shorter, about as long as eye; spines about the dorsal and anal fins short, their bases free from spines. Caudal peduncle with two or three half rows of short spines above and below. Anal, dorsal and caudal of about equal length, 2 into head. Pectorals a little shorter, the upper lobe slightly longer. Color in spirits: Back and sides dusky, with numerous black spots. Belly white. All the fins greenish, with numerous round black dots. One specimen, length 15 inches. Agaña, Guam, July 12, 1900. *Hab.* Seas of India, western Pacific, Marianas.

## FAMILY **SCORPÆNIDÆ.**—ROCK-FISHES.

### GENUS **SCORPÆNA** ARTEDI.

### 254. **Scorpæna bakeri** sp. nov. **Baker's Rock-fish.**

Head 2.50; depth equal to head; eye 4; interorbital 5.50 into head; snout 3 into head; D. XII 10; A. III 5; V. I 5. Maxillary 1.80 into head. Scales about 34, breast scaly, head naked. Body oblong, somewhat compressed. Head large, naked above, with horny spines and dermal filaments. Teeth villiform on jaws, vomer and palatines. Supraocular tentacle more than twice diameter of eye. The dermal flaps along sides of body less than diameter of eye. Occiput with a very shallow depression. Interorbital groove deep and narrow; suborbital stay weak, a small spine in its middle and at its posterior end. Posterior edge of preopercle with four strong spines, the upper one the longest, equal to diameter of pupil and with a minute superimposed spine on its base. Preorbital with a strong spine directed forward and a strong one directed back and down. Nostrils with a distinct spine and dermal filament. Supraorbital bones each with four spines. Opercle with three or four spines; seven spines on each side of nape above opercles. Fins: The second anal spine longest and strongest, its length 2 into head; fourth, fifth and sixth dorsal spines the longest, 2.50 into head. Pectorals equal to distance from posterior margin of opercle to nostril. Base of anal 3.20 into base of dorsal. Caudal rounded, about equal in length to pectorals. None of pectoral rays branched. Color in spirits: Body mottled with dusky and grayish, with slight trace of Indian red; the under side of head is white with about 6 distinct brownish cross bands half as wide as interspaces. Fins grayish, mottled with black and white. Four specimens, length 1.50–2.50 inches. Guam, July 14, 1900. *Hab.* Marianas. Named in honor of Capt. Jesse E. Baker, U. S. A., whose assistance in the author's field work has been greatly appreciated.

### GENUS **SCORPÆNOPSIS** HECKEL.

### 255. **Scorpænopsis guamensis** Quoy & Gaim.

Head 2.35; depth 3; eye 3; interorbital 2 into eye; length of snout slightly less than eye; maxillary 2.50; D. XII 9; A. III 5; V. I 5; P. 19. Scales 44; cheeks and opercles scaled. Teeth villiform in jaws and vomer. Interorbital space concave. No orbital tentacles, no groove beneath the eye. Maxillary reaches to below middle of orbit. Supraorbitals, occipitals, opercles and orbitals with acute spines. Color in spirits: Brownish, with marblings of dark brown. One specimen, length about 3 inches. Guam, July 13, 1900. *Hab.* Malay Archipelago, Marianas.

### GENUS **SYNANCEIA** BLOCK.

### 256-257. **Synanceia thersites** sp. nov.

Head, exclusive of skinny flap, 2.50; depth 2.66; eye 8; premaxillary 3, very narrow and bearing the villiform teeth of upper jaw; the maxillary flat and wide, its width slightly greater than orbit; interorbital space fossa-like, 3.50 into head; D. XIII 7; A. III 6; P. 19; V. I 5. Numerous dermal flaps on head and body. Head monstrous and irregularly shaped; lower jaw almost vertical; the upper margin is on the dorsal surface, its length 1.50 into head. Villiform teeth in both jaws, but none on vomer or palatines. Gill-rakers consisting of villiform teeth slightly longer at angle, and longer curved teeth on head of pharyngeals. Branchiostegals 7. Pseudobranchiæ present. Fins: The dorsal is continuous, the soft part highest. Caudal more or less rounded, 2 into head. Ventrals 1.20. Pectoral very wide, its base about equal to its longest ray. Color in spirits: The general ground color is almost a sepia brown, darker with a wash of greenish on posterior part. There is a more or less greenish white area near the middle of the body, under 6–8 dorsal spines. There is a greenish white band about as wide as eye which forms a band about the middle of the soft dorsal, anal and the posterior part of body. The caudal fin is narrowly tipped with yellowish white with a black subterminal band as wide as eye; anterior of this is a white band of about equal width; the remainder of the fin is blackish. The pectorals are margined with white, their ground color is dusky with more or less mottling of greenish white. Ventrals are similarly colored, except that the mottlings take more of the form of four or five incomplete cross lines. Pectorals and anal dusky, with mottlings of greenish white. Two specimens, length about 9 inches. Guam, July 12, 1900. The dorsal spines of this fish are very poisonous, and the natives fear them more than scorpions. One of the above specimens was damaged by having its head crushed by a native who was intent on killing the fish. Type No. 256, B. P. B. M. *Hab.* Marianas. Named for Thersites, "The ugliest of the Greeks."

### GENUS **PTEROIS** CUVIER.

### 258. **Pterois zebra** Cuv. & Val.

Head 2.66; depth 2.66; eye 2.66 into head; interorbitals 4.50 into head; D. XI I 13; A. III 6; P. 17; V. I 5; C. II 14 II. Scales 10-59-13. Mandibles 1.16 into head. Maxillary 1.50 into head, reaching to a line with anterior margin of pupil. Gill-rakers short and blunt, about 9 on lower arm—armed with minute teeth. Body oblong, compressed. Teeth villiform in jaws and vomer. Interorbital space deeply concave, the upper margins each with a fleshy tentacle one-third as long as head, and alternating white and brown in color. There are four fleshy tentacles on the snout, one just posterior of each anterior nostril, and two in the middle near tip of snout. There is also a short fleshy tentacle on lower anterior corner of preorbitals, and two on each lower posterior margin of each preopercle. The upper margin of orbit is armed with one large and three small spines. Preorbital is armed with several spines and ridges, one ridge extending back near the lower margin of inferior orbital to the preopercle. Immediately beneath this ridge are several small spines. Posterior margin of preopercle armed with three spines. About eight spines on top of head just back of interorbital region. Continuing from the anterior end of lateral line is a row of five small spines extending to orbitals. Scales: Lateral line well developed; scales on nape, body and head, except on snout and interorbitals. Branchiostegals 7. Pseudobranchiæ well developed. Fins: Caudal is rounded, 1.15 into head. Pectorals very elongate, reaching tip of caudal. Spinous dorsal long, the longest spine 2 into length. Ventrals slightly longer than head. Soft dorsal and anal reaching beyond the base of caudal, their longest rays about equal, 1.50 into head. Base of anal 3.08 into base of dorsal. Color in spirits: Ground color sepia brown; three single yellowish white lines over back of neck between the orbitals and first dorsal spine. Beginning with the third dorsal spine the body is banded with twelve narrow, double, white lines with a narrow interspace of brown between each line; these lines seem to be in pairs, four of the narrow white lines with their interspaces making up a band, of which there are seven on the body with interspaces about equal to diameter of eye. The last three pairs of bands extend obliquely forward and down, on the caudal peduncle. Thorax is yellowish white with one broad band of brown extending from the base of one dorsal fin to the other. Snout and under part of head yellow, the snout having two brown spots on each side; a broad brown band from lower anterior margin of eye to posterior end of maxillaries; another, edged with white extends from top of orbitals through eye to lower anterior margin of opercles. Axis of pectorals black, with a wide white line; a curved white line on the fin just posterior of axis. The base of pectoral is brown; a white area on base of rays surrounded by a clouded black area, the black extending half the distance of the rays. Ventrals have yellow rays and black membranes. All the remaining fins are marked with alternating irregular lines of brown and white. The above description is of a male, length 4 inches. Guam, July 13, 1900. A young female, length about 3 inches, taken at the same time, while structurally similar is quite differently marked, and much more nearly resembles Quoy & Gaimard's figure (Voy. Astrol. Poiss, Pl. XI., p. 6), except the upper portion of the white lines are not distinctly divided. *Hab.* Polynesia, Marianas, seas of India.

## FAMILY PLATYCEPHALIDÆ.

### GENUS PLATYCEPHALUS BLOCH & SCHNEIDER.

### 259-60. Platycephalus punctatus Cuv. & Val.

Head 2.66; depth 3.50 into head; eye 4.20 into head; snout 3; interorbital 4 into eye; D. VIII, 11; A. 12. Head flat, spinate; lower jaw the longer. Body sub-cylindrical. The lateral line smooth. Teeth villiform; the maxilla reaches to anterior margin of eye. Supraorbital margin toothed posteriorly, and with a distinct spine anteriorly. Lower margin of inferior orbital with a row of spines which end in the strong spine of preopercle; two small spines just below the preopercular spine. Two spines on snout. Occipital region with several spines. Opercle with two spines on upper posterior part; just above opercle is an irregular row of about six spines reaching to orbit. Fins: Caudal square. Ventrals 1.20. The first dorsal and anal fins of about equal length, 2 into head. Base of soft dorsal slightly less than base of anal. Color in spirits: Grayish, with four or five wide brownish cross bands from the back to middle of sides. Under surface white. Pectorals yellowish, with brown dots and lines. First dorsal yellow, with a broad black mark on posterior third. Ventrals dark above and on posterior third. Soft dorsal and caudal yellowish, with brownish lines or dots. Anal yellow. Two specimens, length 4–6 inches. Guam, July 13, 1900. *Hab.* Seas of India to Malay Archipelago, Marianas.

## FAMILY **AGONIDÆ**.—SEA-POACHERS.

### GENUS **PERCIS** SCOPOLI.

### 261-62. **Percis cephalopunctatus** sp. nov. **Pipupu.**

Head 3.66; depth 6.30; eye 4.66; snout 2.66; interorbital 3 into eye; D. IV 21; A. 17; V. I 5. Scales 71. Mandible 2.15. The lower jaw the longer. Two opercular spines. Body somewhat elongate and sub-cylindrical. Head somewhat depressed. Villiform teeth in jaws and vomer, none on palatines; outer row in jaws somewhat enlarged with three canines on each side in anterior part of lower jaw. Branchiostegals 6. Pseudobranchiæ present. Scales ctenoid. The spinous dorsal is scarcely connected with soft dorsal. Gill membranes connected at isthmus. The second dorsal spine the longest, equal to orbit. Fins: Caudal slightly rounded. Pectorals 1.50 into head. Base of anal 1.50 into base of dorsal. Ventrals 1.15 into head. Color in spirits: Upper surface greenish, with 9 indistinct darker lines over the back. Below axis the color is yellowish white with 9 greenish bands; the upper parts of these bands are all united by a narrow greenish line on the axis extending from axis of pectorals to lower part of caudal fin; just above this line and alternating with the green bands of the lower half are 9 greenish spots almost as large as eye, which have wide yellowish white margins; these extend from pectoral fin to caudal. A large brown spot at base of pectoral fins. Two brown spots on lower part of opercle. Four large brown spots on cheeks, and two or more on jaws. About fourteen small brown dots, smaller than pupil, scattered over snout and top of head. Spinous dorsal white. Soft dorsal with three rows of brown spots. Caudal with a big dark brown blotch on its basal half, with scattered brown dots around it. Pectorals, ventrals and anal white. Three specimens, length 4–5.50 inches. Guam, June 14, 1900. *Hab.* Marianas.

## FAMILY **GOBIIDÆ**.—GOBIES.

### GENUS **ELEOTRIS** (GRONOW) BLOCH & SCHNEIDER.

### 263-66. **Eleotris fusca** (Bl.).

Head 3; depth 4; eye 6.30; snout 3.66; D. VI 9; A. 9. Scales rather small, about 62 series behind pectoral fin. Preopercle with blunt spine bent down and forward. Body subcylindrical, head oblong. Teeth in setiform bands, none on vomer or palatines.

Two dorsal fins. Anal papillæ distinct. The back, in front of first dorsal somewhat concave. Fins: Caudal rounded. First dorsal fin small, its height a little more than one-half depth of body. Pectorals equal to distance from hind margin of preopercle to anterior of orbit. Soft dorsal fin almost one-half higher than spinous dorsal, its base slightly greater than base of anal. Color in spirits: Leaden black, sometimes lighter below with slight wash of yellowish. Fins dusky with lighter fine yellowish lines or dots. Four specimens, length 5–6.50 inches. Guam, May 31, 1900. *Hab.* Polynesia, India, Malay Archipelago, Marianas.

## GENUS **GOBIUS** (ARTEDI) LINNÆUS.

### 267. **Gobius deltoides** sp. nov.

Head 3.50; depth 5; eye 4; interorbital 2 into eye; snout 3 into head; D. VI, I 11; A. I 11. Scales 28 from upper posterior margin of opercle to caudal; no lateral line; head fully scaled. Body slightly elongate, compressed posteriorly. Branchiostegals 5. Pseudobranchiæ present. Teeth in two series in each jaw, the outer row with larger recurved canines. Ventral fins united, forming a disk which is attached only at its base. Caudal rounded. Base of anal about equal to base of soft dorsal. Color in spirits: Yellowish white with about seven reddish brown blotches along the sides above the axis, alternating with similar spots below the axis. A black line extends vertically down from the lower margin of orbit to a brown spot below the eye; here the line divides into two, which extends under the chin, one on a line with the eye, the other forming an angle directed forward, the two lines thus forming the Greek letter delta. These two lines are broken by the isthmus. Anal fins slaty blue. Ventrals with a wash of bluish. The remaining fins are grayish with numerous small brown spots and lines. Eighteen specimens, length 1–2 inches. Guam, June 2, 1900. *Hab.* Marianas.

## GENUS **ELEOTRIS** (GRENOW) BLOCH & SCHNEIDER.

### 268. **Eleotris miniatus** sp. nov.

Head 3.50; depth 3.25; eye 3; snout equal to diameter of eye; the interorbital equal to pupil; D. VI 7; A. II 9. Scales 26. Body oblong, slightly elongated. Teeth in jaws villiform, with some outer enlarged canines; no teeth on vomer or palatines. Fins: The third dorsal spine terminates in an elongated filament reaching half of the distance to base of caudal. The longest soft rays of dorsal and anal are about equal in length, and equal to length of head. Caudal slightly rounded. Pectorals slightly longer than head. Color in spirits: Olive brown with darker markings above the axis which take on more or less the form of half bands from the back to the axis of the body. Most of the scales of the body have a small central dot of pearly white. There is a black band vertically down from the lower margin of the eye to the isthmus. Fins are all dusky. Three specimens, length 1.50 inches. Guam, July 1, 1900. *Hab.* Marianas.

### GENUS **PERIOPHTHALMUS** BLOCH & SCHNEIDER.

### 269. **Periophthalmus kœlreuteri** (Pall.). **Maching.**

Head 3.50; depth 2 into head; eye 4.20 into head; D. XV, 12; A. 11. Scales 90. Eyes large and elevated. Anterior profile of head very abrupt. Body elongate, sub-cylindrical anteriorly, compressed behind. Teeth: About 23 conical pointed teeth in each jaw. Fins: Lower margin of caudal obliquely truncate. The spines of anterior dorsal fin very flexible. Pectoral with its basal portion muscular and free. Ventrals short, connected on their basal third. Color in spirits: Body olive brown; head may have numerous small dots of lighter color. Spinous dorsal dusky, tipped with white, and with a rather wide and distinct sub-terminal band of black. Soft dorsal broadly tipped with white, with a sub-terminal black band, below which is a narrow irregular line of white, the basal third of the fin being more or less white-dotted. Caudal and pectorals dusky. Ventrals white below, dusky above. Anal white. Four specimens, length 4–5 inches. Guam, June 14, 1900. *Hab.* Coasts of India, Andamans, Malay Archipelago, Marianas. These lung fishes are very abundant, and when frightened usually hop out of the water and take to land for safety.

## FAMILY **BLENNIIDÆ.**—BLENNIES.

### GENUS **SALARIAS** CUVIER.

### 270. **Salarias periophthalmus** Cuv. & Val.

Head 4.66; depth 5.33; eye 3.50; interorbital 2 into eye; D. XII, 20; A. 21; C. 15. No scales. Maxilla reaches to below hind margin of eye. Body elongate, cylindrical anteriorly. Snout blunt. Gill openings wide. A simple tentacle about half the length of eye above the orbit, and a fringed one at the nostrils. A row of small movable teeth in each jaw. Fins: Dorsal fin not continuous on to the caudal. Caudal is almost square; the lower rays, however, are a little the longest. Color in spirits: Yellowish white with about six pairs of slightly darker cross bands down the sides. A short oblique blue line just back of and below the eye. A few small dusky spots on side of head. Two rows of dark-margined ovate blue spots down the sides of body. Fins: Yellowish white, the anal with a dark margin. Three specimens, length 2–4.50 inches. Guam, June 2, 1900. *Hab.* Andamans to Malay Archipelago, Marianas.

### 271. **Salarias nigripes** sp. nov.

Head 3.66; depth 3.20; eye 3; interorbital 2 into eye; D. 25; A. 17; V. 3; P. 15. No scales, but an incomplete lateral line which seems to terminate on a line with the tip of the pectoral fins. Maxillæ reaching to below the posterior part of eye. Teeth small, movable; a single row in each jaw; no canines. A small tentacle over the eye, and another at nostril. A fringed row of these short fleshy tentacles over the posterior margin of the head, from the upper margin of one opercle to the other. Body slightly elongate, compressed posteriorly. Branchiostegals 6. Pseudobranchiæ present. Fins: The caudal is square, and equal in length to pectorals. The dorsal commences on a line with tip of opercle and extends to base of caudal fin. The base of anal is contained twice into base of dorsal. Length of pectorals about equal to depth of body, their base 2 into head. Ventrals small, 1.50 into head. Color in spirits: A uniform warm sepia brown, with a few small white dots on snout and below the eye. Anal fin a uniform black. The remaining fins uniform with coloring of the body, except the upper anterior part of dorsal, and the upper third of caudal, which are white; the white on caudal beginning on the base of the upper two or three rays and broadening posteriorly.[7] Thirty specimens, length 1–2.75 inches. Guam, July 12, 1900. *Hab.* Marianas.

### 272. **Salarias nitidus** Gunth.

Head 4.50; depth 5.66; eye 3 into head; interorbital 2 into eye; maxillæ reach to below posterior margin of eye; no scales; D. 32; A. 21. Branchiostegals 6. Gill openings wide. Teeth: A single row of small movable teeth in each jaw; posterior canines not always present. Body somewhat elongate and compressed posteriorly. Mouth transverse, a tentacle about as long as width of eye, on upper part of orbit; also a small one at nostril. Dorsal fin scarcely notched, beginning above the opercle and terminating just in front of caudal. Color in spirits: Yellowish white, with indistinct indications of seven or eight brownish cross bands. A round black dot, slightly smaller than eye, on each side of body, below the notch of the dorsal fin. Head and body with numerous lighter yellowish dots. Dorsal fin with a row of brown dots along middle. Anal and caudal with dark margins. Six specimens, length 1–3.50 inches. Guam, June 14, 1900. *Hab.* Samoan Islands, Marshall Islands, Marianas.

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[7] Regardless of any other differences this white pattern of the caudal fin would seem sufficient to warrant this form to stand as a distinct species, for in the thirty specimens before me there is no variation from this type of caudal marking.

## FAMILY **PLEURONECTIDÆ**.—FLOUNDERS.

### GENUS **PLATOPHRYS** SWAINSON.

### 273-74. **Platophrys pavo** Quoy & Gaim. **Tampat.**

Head 3.66; depth 2; eye 6.50; interorbital 3, concave; D. 95; A. 73. Scales 94, the lateral line curved. Maxillary 2.66, the posterior end being on a line with anterior margin of eye. Mandible 2 into head. The posterior two-thirds of the interorbital space is scaly. The cleft of the mouth is of moderate width. The teeth are small, in a single series in each jaw. The whole of the lower eye is anterior of the upper. Body elliptical, ovate, strongly compressed. Anterior profile slightly concave, the snout projecting (more noticeable in old than in young specimens). Lower jaw with a well developed knob at symphysis. Anterior end of maxillary with a small blunt spine. The elevated orbital rims are smooth. Gill-rakers moderate, their length equal to diameter of pupil—10 on lower limb, none on upper. Scales ctenoid. All the fins except pectorals more or less scaled. Fins: The caudal is rounded. The base of the ventral of the colored side is 3 into head, the base of the ventral on the white side being only one-half as long. The dorsal begins on the snout in front of the eye; the longest ray is 2 into head. The upper rays of the colored pectorals are elongated and filiform. The longest ray of anal is about 2 into head. Color in spirits: A mottled yellowish brown, covered everywhere with numerous ocelli of various sizes, those on middle of sides largest, being equal to longitudinal diameter of orbit; these ocelli usually have a minute brown dot in the middle on a small whitish zone, surrounding which is a blue ring with brown margins, the blue zone making up the largest part of the ocellus. There are three large dusky blotches on the lateral line. The dorsal and anal fins are slightly darker in color, the anal with six small dark blotches along its inner half; the dorsal with about eleven of these dusky splotches; otherwise these fins are mottled with bluish, brown, and whitish spots. Colored pectoral with a dusky blotch near its centre. Four specimens, length 1–9 inches. Guam, June 2, 1900. *Hab.* China, Kokas Islands, New Hebrides, Marianas.

# Notes on the Birds of Kauai.

BY WM. A. BRYAN AND ALVIN SEALE.

THE following observations are based on a collection made jointly by the authors for the Bernice Pauahi Bishop Museum during a short sojourn on the island of Kauai, extending from April 12 to May 4, 1900. The two principal centres of field work were the Kaholuamano mountain house, and in the vicinity of Mr. August Knudsen's home near Waimea.

Kaholuamano, which is the place where Messrs. Wilson, Palmer and Perkins carried on much of their work, is the property of Mr. Francis Gay and is splendidly located in the midst of the forests on the western slopes of Mount Waialeale at an elevation of about 3800 feet above the sea. To the Messrs. Gay and Knudsen we are indebted for much of the success of the trip.

The collection numbers one hundred and forty skins and skeletons, besides some nests and eggs and much valuable alcoholic material. In most cases a very full series was secured of the seventeen species taken. The field jottings are for the most part taken from Mr. Seale's notes whose diary extended over the whole period.

### **Larus barrovianus** Ridgw. **Point Barrow Gull.**

Attention has elsewhere (Memoirs B. P. B. Mus., Vol. I., pt. 3, p. 96) been called to the securing of two specimens of this gull on the island of Kauai by Mr. Francis Gay, whose hospitality we enjoyed, and who was so abundantly able to help us in our work. He kindly presented one of the specimens to the Museum. It was the opinion of that gentleman that they had wandered down to the island from the far north, having been lost at sea. Both specimens were in poor flesh when they were secured, one being unable to fly. One of the birds is still in Mr. Gay's private collection.

### **Diomedea nigripes** Aud. **Black-footed Albatross.**

Our notes for the morning of April 12 take account of this species flying about the ship as we were crossing the channel between Oahu and Kauai.

### **Puffinus newelli** Henshaw. **Ao.**

This species has long been known to the natives of Kauai, where it was called Ao. A single specimen in Mr. Gay's collection was presented to the Museum and was the only example of the bird secured. Mr. Gay states that it is fairly common in certain cliffs in the mountains. It has been his observation that they live at lower elevations and closer to the sea than does the Uau (*Æstrelata phæopygia*). Even when they are found in the same cliffs the Ao keep by themselves in the lower part, and the Uau to themselves higher up. The fact that the native name of this bird has come down to us through all these years, but that the species to which it had been applied by the kanaka naturalists should but so recently come to the light of science speaks much in the favor of those skilled old bird-catchers who had worked out the ornithology of their land with such exactness.

### **Oceanodroma castro** (Harct.). **Hawaiian Storm Petrel. Oeoe.**

No examples of this bird were seen except in the private collection of Mr. Gay. He has found them many times in suitable cliffs on the higher mountains.

### **Phaëthon lepturus** Lacep. & Daun. **White-tailed Tropic Bird. Koae.**

On April 14 our notes state that six tropic birds were seen at different times sailing about the cliffs above the Waimea river, along which stream the path leads for a considerable distance of the way to the mountain house. The splendid cliffs which are in many places hundreds of feet high seem to be ideal nesting sites for this species which, so far as it has been possible to learn, chooses high cliffs in preference to flat rocks, etc., as is the habit of the Red-tailed Tropic Bird on Laysan and Necker Islands. While no specimens were taken during our stay they were seen in various places at intervals during our visit. The specimens in Mr. Gay's collection taken on Kauai, all of which were undoubtably the same as species seen, were the white-tailed form, as are also the skins in the Museum series.

### **Anas wyvilliana** Sclater. **Hawaiian Duck. Koloa maoli.**

On the morning of April 23, while riding along the turbulent mountain stream Wailie, Mr. Seale saw a flock of fourteen of these ducks swimming about in a quiet eddy. Three were taken—two males and a female. Later on three more ducks were seen, but none taken. On May 4, while collecting at Mr. Knudsen's place, several flocks were seen in the low swamps. The pair (Museum No. 9424 ♂, 9423 ♀) are in full plumage. The freshly killed specimens have dark hazel eyes; the bill dark sepia, darkest on the upper mandible, and with a greenish tinge on the sides of upper mandible in the male. The feet are white, with a yellowish cast in the female, and white with an orange yellow tint in the male.

### **Nycticorax nycticorax nævius** (Bodd.). **Black-crowned Night Heron. Auku kohili.**

One immature female (Mus. No. 9433) was taken from flocks near Waimea, where it was abundant in the low lands.

### **Gallinula sandvicensis** Streets. **Hawaiian Gallinule. Alae.**

While collecting in the swamps about Waimea on May 4 this species was noted as especially abundant.

### **Fulica alai** Peale. **Hawaiian Coot. Alae keokeo.**

A female (Mus. No. 9432) was taken in the ponds near Mr. Knudsen's home. The freshly killed bird has a cherry-red eye; the frontal shield is white with a light bluish tip to the upper mandible; the feet are a bluish green. A number of nests of the white-shielded coot were seen among the rushes looking very much like a small platform of grasses with a slight hollow in the centre for the eggs. Usually, though not always, the grass was bent down over the nest so that it was partly concealed. The nests were in colonies of six or eight. One set of six eggs was taken. The nest was among the rushes about twenty feet back from the open water; the rushes were in water fourteen to eighteen inches deep.

### **Himantopus knudseni** Stejn. **Hawaiian Stilt. Kukuluaeo.**

The eggs, nestlings, a half-grown bird and four adults were taken on May 4. The ponds near Mr. Knudsen's house cover an area of several acres, and at this time of year are so shallow that one can wade anywhere in them. Indeed rushes occupy a large part of them. From the great excitement our approach caused it was plain that the birds were nesting. The stilts were wading about in the water or running about on the land. There were hundreds of these birds in sight. They uttered a sharp, rather harsh cry almost incessantly when on the wing. A nest was soon found which proved to be an old one with one bad egg in it. Shortly after Mr. Knudsen found a nest containing two eggs and two recently hatched young. The nest is usually little more than a slight depression in the ground—often an old cow track—with a few broken bits of coarse weeds scratched into it. The nest taken was among some weeds about fifty yards from the water. The old birds were quite fearless. Approaching to within a few feet of us, they would affect all sorts of ailments to decoy us from the nest. A favorite method of decoying was to lay flat on the ground with their wings spread out. They would often affect the broken wing trick which is so frequently adopted by waders. They have a curious sort of dance, in which they bend their long legs at the tibio-tarsal joint and bob up and down in a most ridiculous fashion. Mr. Knudsen said that he had only noticed them performing in this manner during the nesting season. One specimen taken (Mus. No. 9427) was almost half-grown, but as a rule nesting was not so far advanced. A set of four eggs were taken which were too badly incubated to save.

### **Heteractitis incanus** (Gmel.). **Wandering Tattler. Ulili.**

Occasional specimens were seen. On April 23 two birds were noted at an elevation of 3500 feet, while on May 4 in the marshes and ponds they were fairly common.

### **Limosa lapponica baueri** (Naum.). **Pacific Godwit.**

Notice has been taken (Memoirs B. P. B. Mus., Vol. I., pt. 3, p. 27) of the specimen in Mr. Gay's collection which was secured by him. The specimen is in winter plumage and was secured in the late autumn.

### **Charadrius dominicus fulvus** (Gmel.). **Pacific Golden Plover. Kolea.**

On April 14 a flock of five were seen feeding at an elevation of 1200 feet, and at 2000 feet another flock was sighted. They were noted again on May 4 as being quite plentiful at the Waimea ponds. On April 23 a male was taken (Mus. No. 9397) with the testes very much enlarged (.19×.60), going to show that the mating season was well advanced.

### **Phasianus torquatus** Gmel. **Ring-necked Pheasant.**

Pheasants were seen on a number of occasions, but no place were they as common as in the Waianae mountains on Oahu.

### **Turtur chinensis** (Scop.).

Chinese Turtle Doves are quite common on Kauai.

### **Asio accipitrinus sandvicensis** (Blox.). **Hawaiian Owl. Pueo.**

This bird was seen, toward nightfall especially, sailing about the cliffs and over the valleys. On one occasion one was seen to drop almost straight down for perhaps three hundred feet, and after a short time to rise from the bushes and wing off to a tree with what looked like a wild chicken a fourth grown.

### **Chasiempis sclateri** Ridgw. **Apekepeke.**

Of this interesting little fly-catcher a very complete series was secured. They are, like their cousins on Oahu and Hawaii, the most abundant and most easily obtained of any of the native birds.

It is not uncommon to have them approach to within a few feet of one, and after satisfying their curiosity to resume their feeding and calling, so that they are easily studied while alive. They are met with almost invariably in pairs. The ochreous-colored immature birds keeping together and the adult white-rumped ones keeping together, so that we have not yet seen an adult and an immature bird mated. No nests were taken. Everything indicated that it was past the nesting time. An adult was seen feeding a young which was just able to fly. At another time, April 18, a pair of adults were seen feeding four young which were quite able to fly; however, they were being cared for with as much solicitude as they would have been if they were perfectly helpless. One of the four, a juvenile female (Mus. No. 9408), was taken, and since there is no description of this interesting plumage it might be well to note that it more nearly resembles the mature bird than it does the immature plumage which intervenes. The plumage all over has a cottony appearance. The sides, top and back of the head are pale ochraceous mixed with brown, and with bluish gray bases to the feathers. The throat is white with some buffy markings. The breast whitish with faint smoky and ochraceous markings to most of the feathers. The abdomen is whitish. The back and rump mottled with sepia, pale ochraceous and whitish. The wing feathers and coverts are sepia-tipped and narrowly edged with pale ochraceous. The tail is dark sepia with whitish tips on the inner web of all but the centre pair of feathers, and with a faint indication of whitish on the outer edge of the outer pair. The bases of the feathers of the body all over are mouse-gray which in life adds much to the adult appearance of the fledgling stage. The feet are bluish; the eye dark hazel, and the upper mandible dark while the lower is quite yellowish. Length 4.75, wing 2.50, tarsus 1.00, culmen .44. Aside from the fledgling just described the series taken is divided into ochraceous immature, and adults, indicating that it requires at least two years to reach the adult plumage.

### **Acridotheres tristis** (Linn.). **False Mina.**

Common everywhere, ranging to the summit of Waialeale.

### **Carpodacus mexicanus obscurus** McCall. **House Finch. "Rice Bird."**

Common on lowlands; one specimen taken at Kaholuamano.

### **Munia nisoria** (Temm.). **Chinese Sparrow.**

Common in flocks in the valleys.

### **Vestiaria coccinea** Forster. **Iiwi.**

A fine series was taken in both immature and adult plumage. It seems to require at least two years for the Iiwi to assume the plumage of the adult.

### **Himatione sanguinea** (Gmel.). **Apapane.**

The Apapane is fairly common on Kauai. Several flocks of from five to fifteen individuals were seen feeding on a single koa or ohia tree. The bird is far more abundant on Kauai than on Oahu.

### **Chlorodrepanis stejnegeri** (Wilson). **Kauai Amakihi.**

Of this sturdy species only four examples were taken. All the specimens seen were feeding among the flowers of the ohia growing at an elevation of not less than 4000 feet. None were noted about Kaholuamano. Doubtless they were more plentiful towards the summit of Waialeale, but the rainy season was on and as a result the whole forest was one all but impassable quagmire, in which it is perilous to even follow the rude trail, to say nothing of taking the chances of losing it in the dense fogs and rains which envelope the summit almost continuously.

### **Chlorodrepanis parva** (Stejn.).

Perhaps the most interesting series of skins secured during the trip was of this species. About Kaholuamano they were seen but rarely, but along the ridges towards the summit of Waialeale they were more and more abundant so far as our explorations extended. At this season they are met with, feeding about in loose flocks of a dozen or more, picking at the flowering ohia. Many times they were secured from trees in which *L. cæruleirostris* (Wils.) and *H. sanguinea* (Gmel.) were feeding. Often they would alight on the low branches to sing or to preen, but they seemed to confine their feeding grounds to the flowers of the ohia which at this season were blooming profusely. On the morning of April 18, while collecting in a little valley which sloped off from the main ridge two miles northeast of the mountain house, at an elevation of about 4000 feet, we noted a tall slender ohia that was growing down close beside the little mountain stream, in rather open ground, though well protected from the wind. Attention was attracted to it by the rather unusual flight of what proved to be a fine adult male (Mus. No. 9365) of *C. parva*. By a careful search it was possible to locate the nest of the bird in the topmost branch of the tree some forty feet from the ground. Shortly after the male was secured the female (Mus. No. 9366) flew straight to the nest and proceeded to feed the young. Climbing the slender swaying tree was a difficult and somewhat dangerous task, but it was rewarded by the securing of the nest figured on the opposite page, and three young birds in the pin feather. A careful search was made on the ground and all about for fragments of the egg shells but nothing was found.

The nest, which is believed to be the first one secured, is situated in a vertical crotch and was virtually hidden from view by the leaves which surrounded it. It is composed externally of coarse

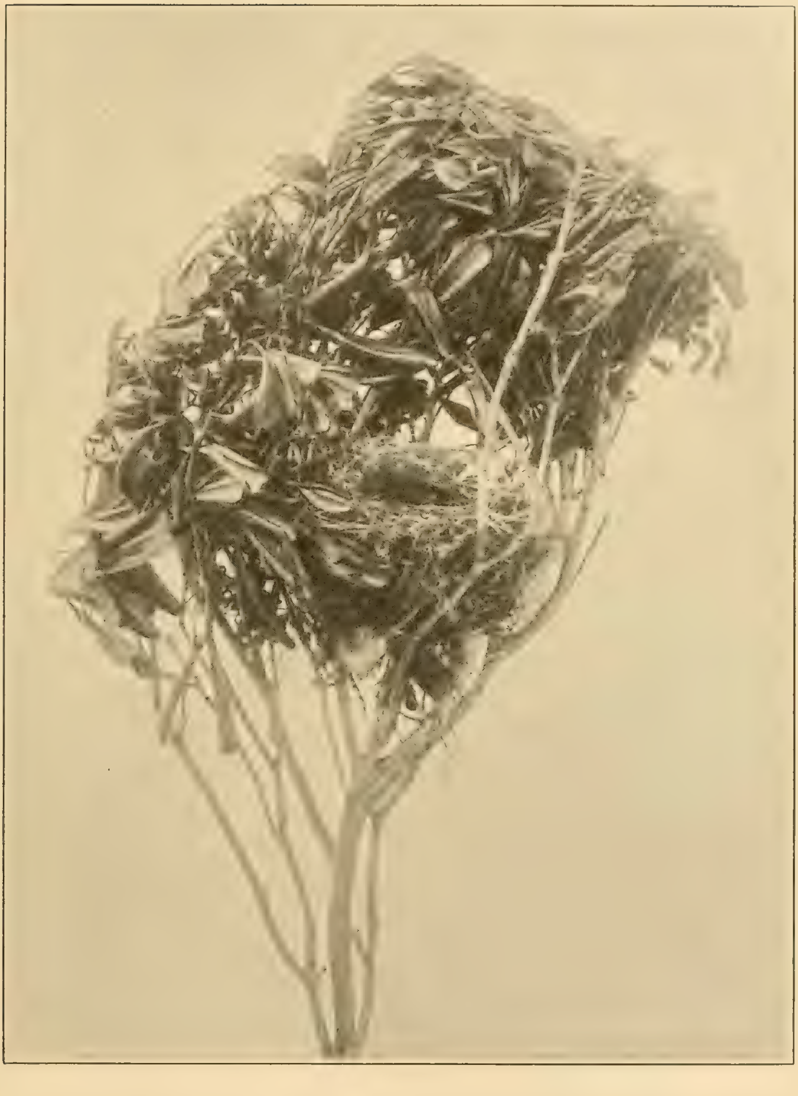

FIG. 7. NEST OF CHLORODREPANIS PARVA (STEJN.).

moss and lichens, into which are loosely placed weed stems, skeletons of leaves, and a few roots. The inside lining is made up almost entirely of stiff black hair-like rootlets. The nest is 3.50 inches deep by 4.00 broad outside; inside it is 2.25 across the bowl by 1.50 deep. In general appearance it more closely resembles nests of *Chlorodrepanis* and *Himatione* than it does the nests of *Oreomyza* in the Museum.

A close study of the material secured has resulted in placing *parva* in the genus *Chlorodrepanis* (Memoirs B. P. B. Mus., Vol. I., pt. 3, p. 46). *Oreomyza bairdi*, which is given by Dr. Stejneger as the type of the genus *Oreomyza*, has the tongue but slightly rolled up on the edges, and the tip is bifurcated; while in *parva* it is perfectly tubular in form, with the brush-like ciliæ at the tip, which is a character well marked in all the members of the *Chlorodrepanis* genus. In adult *parva* the edges of the tongue meet and roll past each other to form the sucking tube. While in the very young, as exhibited by the nestlings just mentioned, the tongue shows no marked lateral rolling, nor does it meet to form a tube. This would seem to indicate most clearly that this form has been evolved from an ancestral type in which this organ was normal, and would remove the form farther from the parental stem than the more typical genus *Oreomyza*.

### **Oreomyza bairdi** Stejn. **Akikihi.**

We secured a good series of this energetic little creeper-like bird. In its search for food it would often come down on the ferns and trunks of trees to within a couple of feet of the ground, but it was never seen to alight on the ground. On other occasions it was seen feeding high up among the ohia branches, but always keeping to the bark and limbs, where its antics remind one of the nut hatches of America. In habit it is totally different from either of the *Chlorodrepanis* of Kauai.

### **Loxops cæruleirostris** (Wils.). **Ou holowai.**

On the ridges two or three miles above Kaholuamano this species is quite plentiful, feeding about the blooming ohia. They are somewhat gregarious—eight to fifteen will sometimes alight in a clump of trees. Their graceful movements and beautiful olive and yellow plumage make them one of the one of the most charming of the Kauai mountain birds. Young birds were secured which would indicate that the breeding season was as early as February.

### **Hemignathus procerus** Cab. **Kauai Akialoa.**

We collected four specimens of this bird and saw a number of others. One young male (Mus. No. 9220) taken April 27 is in a plumage that would make February or March the probable nesting season. The food seems to be largely insects. The eye in the young bird is a dark hazel, the feet gray, and the bill dusky grayish. The above specimen was taken while feeding about the trunks and limbs of an ohia tree much the same as a flicker would do. They use their long bills to feel under bits of bark and in cracks and holes. One was seen to reach under a bit of bark and pull out a big larva which it devoured greedily. Three others were seen near the same place. They are very wary and hard to approach, generally keeping to the higher altitudes, none being seen below 3500 feet. A fine male was taken on April 30 from a flowering ohia tree well on towards the summit of Waialeale.

### **Psittacirostra psittacea** (Gmel.). **Ou.**

A single beautiful male specimen was taken on April 30 at upwards of 4000 feet elevation. Mr. Gay states that the species is far more plentiful in the valleys, where it feeds on the guava often coming down lower than 300 feet elevation after them; and it was his impression that in favorable localities they would come down almost to the sea level if food was more plentiful there.

### **Phæornis myadestina** Stejn. **Kamau.**

On April 18, while sitting in ambush under some trees, two of these birds came and alighted quite near us. They were very quiet, but seeing us their curiosity was aroused, and coming nearer they dropped their wings so that they almost touched the branch they were sitting on, keeping them all the while in a quiver. After satisfying themselves that we were not liable to molest them they flew very near to each other when one seemed to be taking food from the other's bill, or at least to rub his bill through the mouth of the other. These birds were quite similar in color and were billing probably preparatory to mating. The song of this species is remarkably sweet. While the birds are shy, their size together with their song, which is given at all times of day—and on one occasion was heard in the dead of the night—make them not a difficult bird to secure. No young were collected, which taken in connection with the mating performance just detailed would indicate May as their probable nesting time. This species was fairly common, while *Phœornis palmeri* was not met with during our stay.

# List of Accessions.

## DEPARTMENT OF ORNITHOLOGY AND MAMMOLOGY.

### *Mammals Purchased.—Mounted.*

8780 Zalophus californianus, Less. San Francisco, Cal.
8781 Macropus frænatus, Gould. New South Wales.

### *Mammals Collected.*

8782 Herpestes griseus, Geoff. ♂ Collected by A. Seale.
8968 Cervus philippinus, H. Smith. Skull and antlers. Guam, Marianas. Collected by A. Seale.

### *Birds Purchased.—Mounted.*

9185 Macropteryx mystacea, Müller. Duke of York Ids.
9186 Hirundo neoxena, Gould. New South Wales.
9187 Sauromarptis gaudichaudi, Q. & G. New Guinea.
9188 Melidora macrorhina, Less. New Guinea.
9189 Tanysiptera salvadoriana, Ramesq. New Guinea.
9190 danæ, Sharpe.
9191 microrhyncha, Sharpe. New Guinea.
9192 Alcyone azuræ, Ewing. Tasmania.
9193 Menura superba, Davis. ♂ Victoria, Aust.
9194 Chilonyx ochrocephala, Gmel. New Zealand.
9195 Merula obscura, Gmel. Samoa.
9196 Chibia læmosticta, Sclater. New Britain.
9197 Pitta mackloti, Temm. New Guinea.
9198 Lalage tricolor, Swains. New Guinea.
9199 Eopsaltria australis, White. New South Wales.
9200 Gymnorhina hyperleuca, Gould. Tasmania.
9201 Gymnocorvus senex, Less. New Guinea.
9202 Paradisea raggiana, Sclater. New Guinea.
9203 Manucodia atra, Less. New Guinea.
9204 chalybeata, Penn. New Guinea.
9205 comrii, Sclater. New Guinea.
9206 Mænatus religiosus, Less. Malay Peninsula.
9207 Rhytidoceros subruficollis, Blyth. New Zealand(?).
9208 plicatus, Forster. New Guinea.
9209 Lorius hypœnochrous, Gray. Fiji.
9210 Chalcopsittacus scintillatus, Temm. New Guinea.
9211 Trichoglossus rubritorques, Vig. & Horsf. Queensland.
9212 Nasiterna pusio, Sclater. Solomon Ids.

9213 Clyptorhynchus xanthonotus, Gould. South Australia.
9214 Microglossus aterrimus, Vieill. New Guinea.
9215 Globicera oceanica, Less. Samoa.
9216 Carpophaga rufiventris, Salvad. New Guinea.
9217 Melagoprepia assimilis, Gould. Cape York, Aust.
9218 Reinwardtœnas reinwardti, Heine & Rhno. New Guinea.
9219 Otidiphaps cervicalis, Rams. New Guinea.
9220 Goura albertisii, Salvad. New Guinea.
9221 Didunculus strigirostris, Jard. Samoa.
9222 Megapodius cumingi, Dillwyn. Solomon Ids. (?)
9223 Demiegretta sacra, Gmel. (Sum. plum.) Samoa.
9224 sacra, Gmel. (Wint. plum.) Samoa.
9225 Carphibis spinicollis, Reich. New South Wales.
9226 Himantopus leucocephalus, Gould. Australia.
9227 Porphyrio melanotus, Newt. New Zealand.
9228 Tribonyx mortieri, Dubos. Queensland.
9229 Amaurornis moluccana, Wall. Duke of York Id.
9230 Chenonetta jubata, Brandt. Tasmania.
9231 Nettopus pulchellus, Gould. New Guinea.
9232 Spatula rhyncholus, Gray. New Zealand.
9233 Gabianus pacificus, Bruch. Australia.
9234 Larus dominicanus, Licht. New Zealand.
9235 Phalacrocorax carunculatus, Steph. New Zealand.
9236 Pelicanus conspicillatus, Reich. New South Wales.
9238 Mino dumonti, Less. Duke of York Id.
9239 Phalacrocorax varius, Gmel. New Zealand.
9240 Drepanornis albertisi, Sclater. New Guinea.
9241 Parotia sexpennis, Bodd. New Guinea.
9242 Lophorhina superba, Vieill. New Guinea.
9243 Paradigalla carunculata, Eyd. & Souleyet. New Guinea.
9244 Xipholena pompadora, Gould. New Guinea.
9255 Megaloprepia magnifica, Temm. New Guinea.

## *Birdskins Given.*

9285 Vestiaria coccinea, Forster. ♀ Oahu, H. I. Given by Dr. Huddy, Honolulu.
9305 Larus glaucus, Brunn. Kauai, H. I. Given by Francis Gay Esq., Waimea, Kauai.
9306 Puffinus newellii, Henshaw. Kauai, H. I. Given by Francis Gay Esq., Waimea, Kauai.

## *Birdskins Collected.*

By A. Seale, on Oahu, H. I.

9149–55 Haliplana fuliginosa, Gmel. 6 ♂, 1 ♀.
9156–58 Anous stolidus, Linn. 3 ♂.
9159 Totanus incanus (Gmel.). ♀
9160 Phasianus torquatus, Gmel. ♀
9161 Charadrius dominicus fulvus (Gmelin). ♀

9162–3 Totanus incanus (Gmelin). 1♂, 1♀.
9164–5 Microanous hawaiiensis, Roths. 2♂.
9166–7 Dafila acuta, Linn. 1♂, 1♀.
9168 Anas wyvillianus, Sclater. ♂
9169 Porphyrio melanotus, Newt. ♂
9170 Nycticorax nycticorax nævius (Bodd.). ♂
9171 Arenaria interpres (Linn.). ♀
9172–3 Charadrius dominicus fulvus (Gmel.). ♂
9174 Arenaria interpres (Linn.). ♀
9175 Nycticorax nycticorax nævius (Bodd.).
9176 Acridotheres tristis, Linn.
9180 Asio accipitrinus, Pall. ♀
9182–4 Turtur chinensis, Scop. 2♀, 1♂.
9246–70 Chasiempis gayi, Wilson. 16♂, 9♀.
9271 Turtur chinensis, Scop. ♂
9272 Asio accipitrinus, Pall. ♂
9273 Acridotheres tristis, Linn. ♂
9274–84 Himatione sanguinea, Gmel. 6♂, 5♀.
9286 Himatione sanguinea, Gmel. ♂
9287–89 Chlorodrepanis chloris, Cab. 2♂, 1♀.

By Wm. A. Bryan and A. Seale, on Kauai, H. I.

9307–25 Himatione sanguinea, Gmel. 12♂, 7♀.
9326–51 Vestiaria coccinea, Forster. 17♂, 8♀, 1 juv.
9352–61 Loxops cæruleirostris, Wilson. 8♂, 2♀.
9362–82 Chlorodrepanis parva, Stejn. 10♂, 11♀.
9383–92 Phæornis myiadestina, Stejn. 5♂, 4♀, 1 ?.
9393–96 Chlorodrepanis stejnegeri, Wilson. 3♂, 1♀.
9397 Charadrius dominicus fulvus, Gmel.
9398–9403 Oreomyza bairdi, Stejn. 2♂, 4♀.
9404–17 Chasiempis sclateri, Ridgway. 7♂, 6♀, 1 ?
9418–22 Hemignathus obscurus, Gmel. 3♂, 2♀.
9423 Psittirostra psittacea, Gmel. ♂
9424–25 Anas wyvilliana, Sclater. ♂
9426–30 Himanotopus knudseni, Stejn. 2♂, 3♀.
9431 Charadrius dominicus fulvus, Gmel. ♀
9432 Fulica alai, Peale, ♂
9433 Nycticorax nycticorax nævius, Bodd. ♀
9434 Anas wyvilliana, Sclater. ♂
9435 Loxops cæruleirostris, Wilson. ♂
9436 Chlorodrepanis parva, Stejn. ♂
9437 Oreomyza bairdi, Stejn. ♂
9438 Chasiempis sclateri, Ridg. ♂
9439 Himatione sanguinea, Gmel. ♀
9440 Vestiaria coccinea, Forster. ♀
9441–44 Gallus gallus, Linn. ♂, ♀, and juv.

By A. Seale, on Guam, Marianas.

9449–69 Myzomela rubrata, Less. 15♂, 2♀, 4 juv.
9470–75 Rhipidura uraniæ, Oust. 3♂, 3♀.

9476–86 Myiagra freycineti, Oust. 3♂, 6♀, 1 juv., 1 ?.
9487 Corvus kubaryi, Rchw. ♀
9488–98 Ptilinopus roseicapillus, Less. 8♂, 2♀, 1 juv.
9499–9501 Turtur dussumieri, Temm. 1♂, 2♀.
9502–15 Phlegœnas xanthonura, Temm. 8♂, 6♀.
9516 Sula piscatrix, Linn. ♂
9517–23 Charadrius fulvus, Gmel. ♂
9524–5 Heteractitis incanus, Gmel. ♂
9526 Charadrius mongolus, Pall. ♀
9527–8 Excalfactoria sinensis, Gmel. 1♂, 1♀.
9529–32 Collocalia fuciphaga, Thunb. 2♂, 2♀.
9533–35 Anas oustaleti, Salvad. 1♂, 2♀.
9536–40 Hypotænidia oustini, Roths. 1♂, 3♀, 1 juv.
9541–44 Acrocephalus luscinia, Quoy & Gaim. 3♂, 1♀.
9545–50 Halcyon cinnamonea, Swains. 3♂, 3♀.
9551 Poliolimnas cinereus, Vieill. ♀
9552–65 Aplonis kittlitzi, F. & Hartl. 4♂, 6♀, 4 juv.
9566–77 Zosterops conspicillata, Kittl. 1♂, 9♀, 2 juv.
9578–84 Gygis alba Kittlitzi, Hart. 5♂, 1♀, 1 juv.
9585–88 Demiegretta sacra, Gmel. 1♂, 3♀.
9589–93 Anous stolidus, Linn. 3♂, 2♀.
9594–99 Gallinula chloropus, Linn. 2♂, 4♀.
9600–02 Ardetta sinensis, Gmel. 2♂, 1♀.
9603 sinensis bryani, Seale. (Type.)
9604–07 sinensis bryani, Seale. 1♂, 3♀.
9608 Fregata aquila, Linn. ♂ (Given by Lieut. W. E. Safford.)

By A. Seale, in Monterey, Cal.

9609 Archimophorus occidentalis, Lawr. ♂
9610 Gavia pacificus, Lawr. ♂
9611–12 Colymbus nigricollis californicus, Heerm. 1♂, 1♀.
9613 Stercorarius pomarinus, Temm. ♀
9614 longicaudus, Vieill. ♀
9615 Sterna maxima, Bodd. ♂
9616–20 elegans, Gamb. 4♂, 1♀.
9621–24 Larus philadelphia, Ord. 2♂. 2♀.
9625 heermanii, Cass. ♂
9626 brachyrhynchus, Rich. ♀
9627–29 occidentalis, Aud. 1♂, 2♀.
9630–34 Ceratorhyncha monocerata, Pall. 1♂, 4♀.
9635–36 Fulmarus glacialis glupischa, Stejn. 1♂, 1♀.
9637 Puffinus opisthomelas, Cones. ♀
9638–9 griseus, Gmel. 1♂, 1♀.
9640 Cepphus columba, Pall. ♂
9641 Brachyramphus marmoratus, Gmel. ♀
9642 Uria triole, Linn. ♂
9643 Munia nisoria, Temm. ♂ Oahu, H. I.

## DEPARTMENT OF ENTOMOLOGY.

Received 27 boxes insects, divided as below, being part of the collection made in the Hawaiian Islands by Mr. R. C. L. Perkins: 7 boxes containing Lepidoptera ; 9 boxes containing Neuroptera ; 3 boxes containing Coleoptera ; 3 boxes containing Hymenoptera ; 5 boxes containing Orthoptera.

Collection of American Butterflies from Mrs. Sarah H. Mitchell, Kansas City, Mo.

## DEPARTMENT OF CONCHOLOGY.

Part of the collection made in the Hawaiian Islands by Mr. R. C. L. Perkins, consisting of the land shells of the Achatinellidæ, Succineidæ and Tornatellidæ.

Collection of land and marine mollusca made in Guam by Mr. Seale. Not yet classified.

## DEPARTMENTS OF BOTANY AND GEOLOGY.

Collection of botanical specimens made on Kauai by Messrs. Bryan and Seale, and a collection made by Mr. Seale in Guam. These will be classified later.

8575–8577 Argyroxiphium sandwicense, De Cand. Haleakala, Maui. Three specimens given by Miss Carrie Castle.

## DEPARTMENT OF GEOLOGY.

8,566 Zeolite, from Nuuanu Valley, Oahu, H. I. Given by Mr. F. Rowald.

10,010 Collection, 25 specimens from North America and the West Indies. Given by Mrs. S. M. Damon.

## DEPARTMENT OF HERPETOLOGY.

7,960 Cast of Crotalus adamanteus. Arizona.

7,961 Cast of Crotalus adamanteus (juv.). Arizona. Given by Mr. John W. Thompson.

Given by Prof. H. W. Henshaw, Hilo, H. I.

10,042 Emoia cyanura, Lesson. Keaukaha, Hawaii.

10,043–4 Ablepharus boutonii pœcilopleurus, Wiegmann. Keaukaha, Hawaii.

10,045 Ablepharus boutonii pœcilopleurus, Wiegmann. Naolelo, Kau, Hawaii.

10,046 Leiolopisma noctua, Lesson. Coconut Island, Hawaii.

10,047–8 Peropus mutilatus, Wiegmann. Kau, Hawaii.

10,049 Hemidactylus garnotii, Dumeril & Bibron. Hilo, Hawaii.

10,050–4 Lepidodactylus lugubris, Dum. & Bib. Hilo, Hawaii.

10,055 Lepidodactylus lugubris, Dum. & Bib. Kau, Hawaii.

10,056 Lepidodactylus lugubris, Dum. & Bib. Keaukaha, Hawaii.

## DEPARTMENT OF ICHTHYOLOGY.

Collection of fishes made by Mr. A. Seale on Guam. Named and numbered on previous pages.

## SPONGES, CORALS, ASTEROIDS AND MISCELLANEOUS.

8,996–7 Euplectella aspergillum, Owen. Zamboanga. Philippine Islands. Given by Hon. Dean C. Worcester, Philippine Commission.
10,011 Hyalonema sieboldii, Gray. Japan.
8,935 Asterias sp. Koloa, Kauai. Given by A. F. Judd Esq.
8,936 Ophidiaster sp. Koloa, Kauai. Given by Miss Georgiana Williams.
10,012 Pocillopora granis, Dana. Society Islands.
10,016 Renilla amethystina. California.

## ETHNOLOGY AND ANTHROPOLOGY.

7,508 Pohaku hana ikaika. Kauai. Given by W. H. Rice, Jr.
7,509 Skull of young Hawaiian girl. Kauai. Given by J. K. Farley Esq.
7,551 Canoe model. Marshall Ids. Given by A. F. Judd Esq.
7,625 Stone dish, oval, knob on each end. Hawaiian Ids.
7,628 Sling stone. Oahu.
7,868–70 Umeke poi, kou (*Cordia subcordata*). Wooden bowls. Hawaiian Ids.
7,952–3 Poi boards of koa. Hawaiian Ids.
7,954–5 Poi pounders, ring form. Kauai, H. I.
7,956 Disk, thick, wooden. Hawaiian Ids.
7,957 Polishing stone. Hawaiian Ids.
7,958 Stone lamp. Hawaiian Ids.
7,959 Stone mortar or lamp. Hawaiian Ids.
8,090 Basket of fern stems; modern Hawaiian manufacture.
8,540 Strips of plaited Pandanus and fern stem prepared for hat making. Kauai. Coll. A. Seale.
8,541 Fern stem. Kauai. Coll. A. Seale.
8,542 Peelings from No. 8541 used in No. 8540. Coll. A. Seale.
8,543 Leaves of loulu (Pritchardia sp.) palm. Coll. A. Seale.
8,544 Strips of loulu palm prepared for weaving. Coll. A. Seale.
8,569 Body of very young baby (Hawaiian) dried and wrapped in kapa. Oahu.
8,578 Hat of bambu, Samoan. Given by Mrs. Falke.
8,636–64 Umeke poi (29) of kou (*Cordia subcordata*) and milo (*Thespesia populnea*), ranging in sizes from 7×2½ inches to 19×7½ inches. Purchased in Honolulu.
8,665 Ipu kai, Fish dish, kou. Purchased in Honolulu.
8,666–7 Two wooden boxes containing outfits for members of Hale Naua, Honolulu. Bequeathed by deceased members.

7,974 Filipino skull. Given by Col. Woodruff.

Given by the Trustees of Oahu College, Honolulu.

8,671 Helmet of ieie (*Freycinetia arnottii*). Hawaiian Ids.
8,672–7 Kapa beaters. Hawaiian Ids.
8,678 Ulu maika. Hawaiian Ids.
8,679 Adz head, unfinished. Hawaiian Ids.
8,680 Adz head. Hawaiian Ids.
8,681 Drum, sharkskin head. Marquesas Ids.
8,682–5 Wooden legs, showing tatu pattern. Marquesas Ids.
8,686 Carved wooden dish. Marquesas Ids.
8,687 Neck ornament of human hair bound with sennit. Marquesas Ids.
8,688–9 Anklets of human hair. Marquesas Ids.
8,690 Coronet, band of braided sennit supporting pearl shell. Marquesas Ids.
8,691 Pair bone ornaments. Marquesas Ids.
8,642–3 Staves of wood ornamented at one end with human hair. Marquesas Ids.
8,694 Club. Marquesas Ids.
8,695 Nose flute. (?)
8,696 Club, pineapple type. Fiji.
8,697 Club. Tonga.
8,698–9 Club-shaped sword, coconut wood. Gilbert Ids.
8,700–2 Spears edged with shark's teeth. Gilbert Ids.
8,703 String of human teeth. Gilbert Ids.
8,704 Large round ball of sennit, 3 feet 3 inches in circumference. Marshall Islands.
8,785 Cinet covered with fine matting. Marshall Ids.
8,786 Shell adz. Marshall Ids.
8,787 Canoe bailer, breadfruit wood. Caroline Ids.
8,788 Canoe bailer (model). Ruk, Caroline Ids.
8,789 Tol, male dress of banana fibre. Caroline Ids.
8,790 Dance paddle. Mortlock Ids.
8,791 Walrus head (*Trichecus obesus*). Alaska.
8,819 Bracelet of bear tusks. Hawaiian Ids.
8,820 Kupee niho ilio, in fragments. Hawaiian Ids.
8,821 Bundle of kapa markers (10). Hawaiian Ids.
8,822 Kapa ruler. Hawaiian Ids.
8,823–4 Baskets of unknown locality.

From other sources.

8,811 Stone idol. Kailua, Hawaii.
8,812–14 Kapa. Hawaiian Ids.
8,815 Poi pounder, unfinished. Oahu. Given by Edw. Aikua.
8,816–17 Kapa. Hawaiian Ids.
8,818 Notification of the cession of the Hawaiian Islands to Great Britain in 1843; marked on copper. Given by Prof. F. A. Hosmer.

8,931 Stone adze head. Hawaiian Ids.
8,932–3 Samoan paddles. Given by Lieut. W. E. Safford.
8,934 Samoan club. Given by Lieut. W. E. Safford.

Collected by Mr. A. Seale, in Guam, Marianas.

8,937 Bambu water carrier. Agaña.
8,938–41 Mats, Pandanus. "
8,942 Basket, Pandanus. "
8,943 Sack, Pandanus. "
8,944 Rope of Hibiscus fibre. "
8,945 Basket, Pandanus. "
8,946 Bag, Pandanus. "
8,947 Basket, Pandanus. "
8,948–9 Pandanus leaves, dried. "
8,950–1 Hats of Pandanus. "
8,952 Bambu fire sticks. "
8,953 Fillet of grass and Pandanus. From the Caroline Islanders' settlement at Guam.
8,954–6 Dresses of Hibiscus. Caroline Islanders' settlement at Guam.
8,957 Dress of Hibiscus. Ruk, Caroline Ids. Given by Lieut. W. E. Safford.
8,958–59 Hats of Pandanus. Caroline Islanders' settlement at Guam.
8,960 Necklace of flower stamens, plaited. Caroline Islanders' settlement at Guam.
8,961 Iron ground cultivator. Agaña.
8,962–3 Iron lance heads. "
8,964 Iron fish spear. "
8,965 Machete and sheath. Given by Lieut. W. E. Safford. Agaña.
8,966 Sling stone. Given by Padre Paloma. Agaña.
8,967 Sling stone. Agaña.
8,998 Broom, made of midribs of coconut leaves. Agaña.
8,999–9,000 Brooms, made of grass. Luçon, Philippine Ids.

Received from the late C. M. Hyde, D.D.

8,969 Spear. Samoa.
8,970 Fly-flap. Samoa.
8,971 Drill. Tapituea, Gilbert Ids.
8,972 Club made from a whale rib. Gilbert Ids.
8,973 Club made from coconut wood. Maiana, Gilbert Ids.
8,974 Adze. Maiana, Gilbert Ids.
8,975 Adze.
8,976 Ladle of coconut. Gilbert Ids.
8,977 Implement of unknown use. Micronesia.
8,978 Dance wand, small. Marshall Ids.
8,979 Dance paddle. Ponape, Caroline Ids.
8,980–1 Dance wands. Ruk, Caroline Ids.

8,982 Poi pounder of coral rock. Caroline Ids.
8,983 Canoe model. Caroline Ids.
8,984 Club. Samoa.
8,985 Pillow, bambu. Samoa.
8,986–90 Sandals. Hawaiian Ids.
8,991 Basket for fish or shrimps. Hawaiian Ids.
8,992 Coconut cup. (?)
8,993–4 Strings of Conus disks. Gilbert Ids.
10,033 Adz head, stone, small. Hawaiian Ids.
10,034 Fragment of the stalagmite used in Bonabe, Gilbert Ids., to make fish hooks for bonita.

*Silverware.—Given by the Hon. C. R. Bishop.*

10,001 Tea service, at one time property of Kanaina.
10,002 Forks (8), at one time property of Kekuanaoa.
10,003 Sugar tongs, at one time property of Kekuanaoa.
10,004 Dessert spoon, at one time property of Paki.
10,005 Soup ladle, at one time property of Kuakini.
10,006 Tea spoons (7), at one time property of Kuakini.
10,007 Tea spoons (10), at one time property of Keelikolani.
10,008 Forks, small (12), at one time property of Kekauluohi.
10,009 Sugar tongs, at one time property of Kuakini.

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10,013–14 Clubs from New Guinea.
10,015 Club. New Britain.

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[Those marked with an asterisk were obtained by exchange.]

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| No. 214. | Solomon Islands. |
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No. 195. Mississippi River, from Grand Prairie to New Orleans, Louisiana.

No. 910. Puerto Rico.

No. 911. Puerto Rico, Ponce Harbor.

No. 3008. North Carolina and Tennessee.

No. 3054. City of San Francisco.

No. 3055. San Francisco Peninsula.

No. 3056. Mount Desert Island, Maine.

No. 3214. St. Paul Island, Pribilof Group, Alaska.

No. 3215. Reef, Gorbatch and Ardigren Rookeries, St. Paul Island, Alaska.

No. 3216. Lukanin and Kitovi Rookeries, St. Paul Island, Alaska.

No. 3217. Tolstoi Rookery, St. Paul Island, Alaska.

No. 3218. Zapadni Rookery, St. Paul Island, Alaska.

No. 3219. Little Zapadni and Zapadni Reef Rookeries, St. Paul Island, Alaska.

No. 3220. Polovina, Polovina Cliffs and Little Polovina Rookeries, St. Paul Island, Alaska.

No. 3221. Morjovi Rookery, St. Paul Island, Alaska.

No. 3222. Vostochni Rookery, St. Paul Island, Alaska.

No. 3223. Lagoon Rookery, St. Paul Island, Alaska.

No. 3224. St. George Island, Pribilof Group, Alaska.

No. 3225. Zapadni Rookery, St. George Island, Alaska.

No. 3226. North Rookery, St. George Island, Alaska.

No. 3227. Staraya Artil and Little East Rookeries, St. George Island, Alaska.

No. 3228. East Rookery, St. George Island, Alaska.

No. 3231. Guanica Harbor, Puerto Rico.

No. 3232. Chart of part of the Bahama Islands, showing the tracks ascribed to Columbus on his discovery of the New World.

No. 4100. Hawaiian Islands.

No. 5200. Pacific Coast, from Santa Monica to Point Conception, including Santa Barbara Channel, California.

No. 5600. Pacific Coast, from San Francisco to Point Arena, California.

No. 8500. Northwest coast of America; Icy Cape to Simedi Islands.

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## *Manuscript.*

Lists of Hawaiian words classified according to their arts, manufactures, worship, etc.

Notes in preparation of a Hawaiian grammar.

Papers on Hawaiian relationships.

A chronological catalogue of publications in the Hawaiian language, not including the sacred scriptures, nor laws, nor reports nor periodicals.

Several loose notes on Hawaiian literature, including "The story of Loe" in Hawaiian and translated into English.

Mele kumuhonua.

Mele olioli keia.

List of birds, fish and plants in the Hawaiian language.

Texts in Hawaiian.

Biblical introduction in Hawaiian.

Portion of dictionary in a dialect of Micronesia.

Notes on Polynesian matters.

# OCCASIONAL PAPERS

OF THE

# BERNICE PAUAHI BISHOP MUSEUM OF POLYNESIAN ETHNOLOGY AND NATURAL HISTORY.

VOL. I.—NO. 4.

# A. Seale: New Hawaiian Fishes.

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HONOLULU, H. I.
BISHOP MUSEUM PRESS.
1901.

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National Museum

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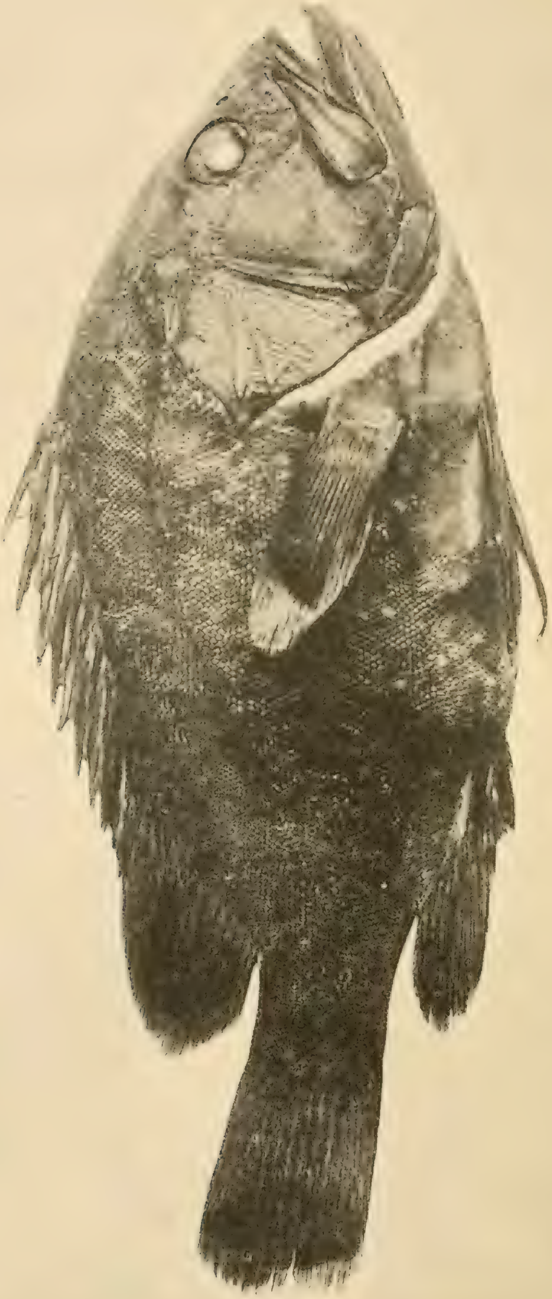

FIG. I. EPINEPHELUS QUERNUS SP. NOV.

# Seale: New Hawaiian Fishes.

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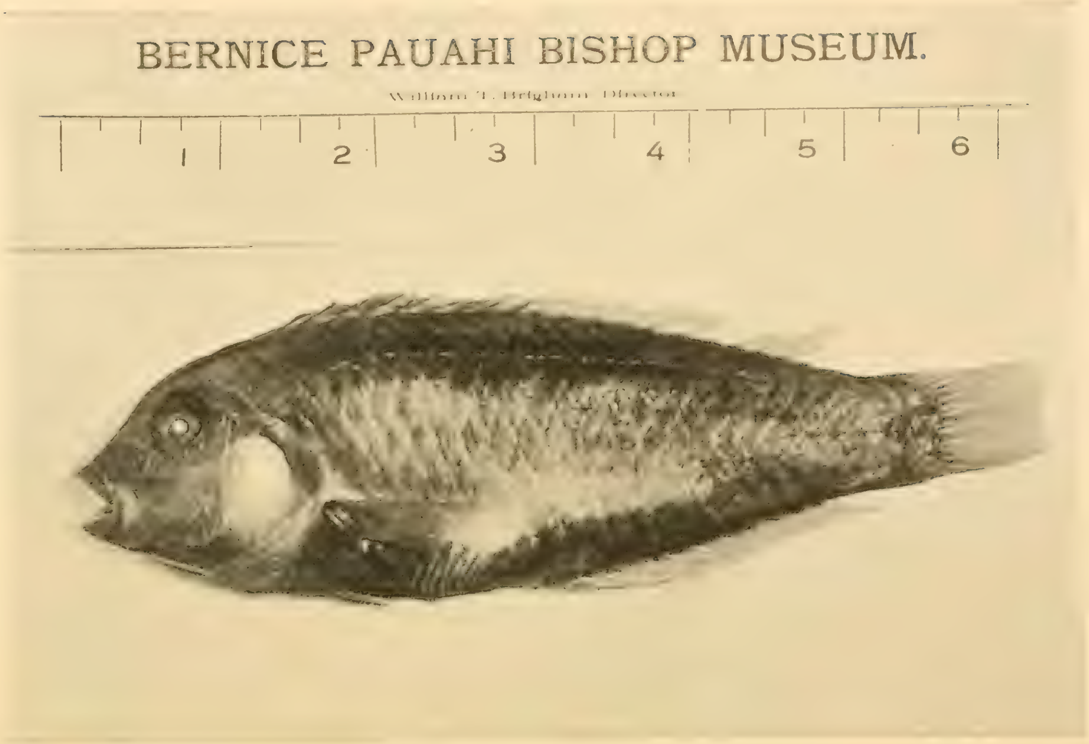
### 481. **Epinephelus quernus** sp. nov. Fig. 1.

Head 2.50 into length, exclusive of caudal; depth 2.50; D. XI 14; A. III 9; P. 19; V. 1–5. Scales ctenoid, very small, 130 in the lateral line. Opercles and top of head scaled; eye 5.75 into head, equal to interorbital space. Snout 3.85. Body compressed. Mouth protractile. Teeth: Cardiform teeth on jaws, vomer and palatines; those on jaws in two or more rows, the inner ones depressable; two rather prominent anterior canines in each jaw. Tongue smooth. Maxillary reaches posterior of orbit and is without a supplemental bone, its length 2.79 into head. Preopercles serrated, the serri larger at angle. Opercle with three flat spines, the middle one nearer the lower than upper. Pseudobranchiæ developed. Gill-rakers rather flat and triangular in shape, 15 on the lower limb, the longest equal to one-half the diameter of eye. Fins: Caudal rounded, about equal in length to pectorals—1.75 into head. Dorsal spines long and strong, the fourth spine the longest, 2.16 into head, and three times as long as first spine. Ventrals situated directly below the lower base of pectorals and about equal to pectorals in length. Third anal spine the longest, equal in height to caudal peduncle; base of anal 3.20 into base of dorsal; posterior of soft dorsal and anal rounded.

Color in life: Reddish brown, the lower third of belly bluish, with irregular splotches of brown; there are a few indistinct white spots scattered over the body. Basal half of pectorals, ventrals and anal bluish, their outer half black. Dorsal dusky, with a bluish wash on webs of spinous dorsal. Caudal dusky. Iris yellow.

Color in spirits: Reddish brown, lower third of fish with wash of bluish; a few indistinct bluish white dots on body. These dots seem to be arranged in about five vertical rows, but are so indistinct as to be readily passed over without being seen. Fins dusky.

One specimen. Length 10 inches. Honolulu, August 9, 1901. *Hab.* Hawaiian Islands. Type No. 481, B. P. B. M.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William T. Brigham Director
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FIG. 2. NOVACULICHTHYS TATTOO SP. NOV.

### **611. Novaculichthys tattoo** sp. nov. Fig. 2.

Head, from tip of opercle flap to base of caudal, 3.30; depth 3.20; eye 5.12; interorbital equal to eye; snout 2.75 into head; D. IX 12; A. III 12; V. I–5; P. 12. Scales 2-27-8. Head naked. Lateral line interrupted. Body oblong, compressed. Teeth: A single row of small sharp-pointed teeth in each jaw, the two anterior ones enlarged canines; the upper jaw has a few minute teeth just inside the outer row near tip; no canine tooth at angle of jaw. Branchiostegals 7. Pseudobranchiæ well developed. Fins: Dorsal spines rather short and weak, the longest spines equal to interorbital space. Caudal rounded. The first ventral spine is somewhat elongate, 1.50 into head. Base of anal 1.50 into head.

Color in life: Very light yellowish brown, with a wash of pinkish. A large yellow splotch on the sides of the belly, from which five pairs of narrow but bright and distinct yellow lines extend entirely around the belly almost like ribs, or the tattoo marks used by the blacks of Australia. Fins all uniform yellowish white, except the spinous dorsal which has a round black dot between each spine along the middle of the fin. In spirits the general color becomes more pink.

One specimen. Length 6 inches. Honolulu, August 9, 1901. *Hab.* Hawaiian Islands. Type No. 611, B. P. B. M.

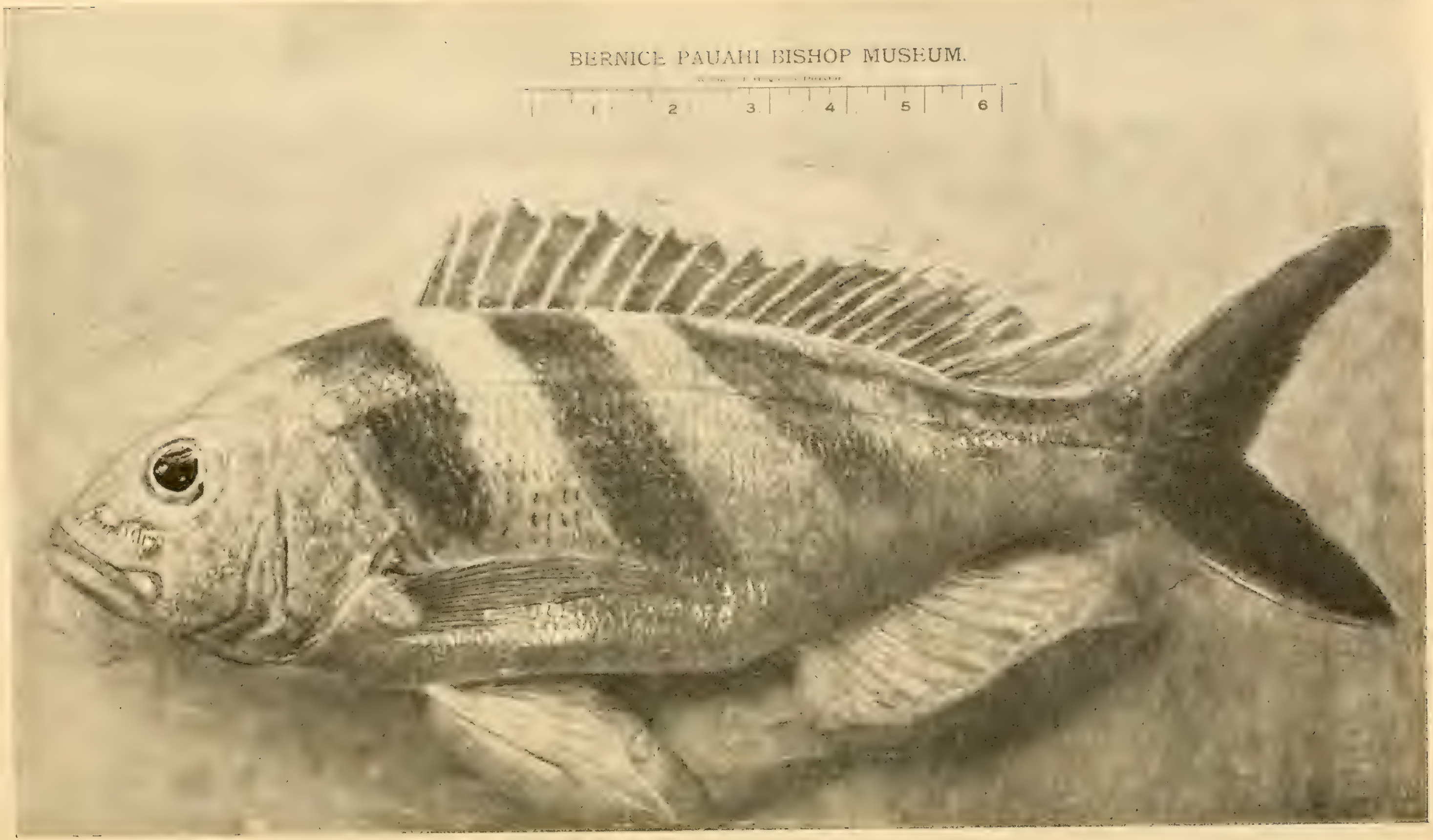
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FIG. 3. SERRANUS BRIGHAMI SP. NOV.

### **625. Serranus brighami*** sp. nov. Fig. 3.

Head, with opercular flap, 3 into length to base of caudal; depth 3; D. x 11; A. III 8; V. I–5; P. 15. Scales 8-70-17. Lateral line continuous. Top of head, the snout and chin naked. Eye 3.75 into head; interorbital 4; snout 3.10. Body oblong and compressed. Maxillary without a supplemental bone; the entire maxillary, except the distal end, hidden in the preorbital. Preopercle serrated. Opercle with two flat spines at posterior edge. Teeth: Patches of small teeth in jaws, vomer and palatines; jaws with an enlarged outer row of canines; no teeth on tongue. Gill-rakers rather long and flat, 12 on lower limb, the longest equal to diameter of pupil. Preorbital wide. Fins: Caudal deeply forked, the lobes equal; middle ray of fin about equal to diameter of eye. The fourth dorsal spine the longest, 2.75 into head; the last rays of the soft dorsal and anal slightly prolonged, 2 into head; base of anal 3 into base of dorsal. Pectorals long and somewhat falcate, equal to length of head. Ventrals situated slightly posterior of line with pectorals, long, reaching to anus.

Color in life: Ground color pinkish white; three distinct wide yellow bands, as wide as interspaces, extending obliquely down and back on sides of the body; the first from nauchal region to a little posterior of axis of pectorals; the second, from third to sixth dorsal spines, ending above and anterior of vent on a line with lower base of pectorals; the third, from eighth dorsal spine to third dorsal ray, ending above and on a line with fifth-eighth anal rays; posterior of this last band, above the lateral line, there is a wash of yellowish reaching to base of caudal. Dorsal fin cadmium yellow; caudal yellow, the upper lobe with tint of pink; pectorals pinkish. Ventrals and anal white; iris whitish, the pupil deep blue. Sides of head and jaws with a few deeper splotches of pinkish. In spirits the yellow bands fade so that the interspaces show more distinctly than the bands. The fish also becomes a deeper pinkish, the fins becoming whitish.

One specimen. Length 15.50 inches. Honolulu, October, 1901. *Hab.* Hawaiian Islands. Type No. 625, B. P. B. M.

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*Named in honor of my esteemed friend Wm. T. Brigham, Director of the Bernice Pauahi Bishop Museum.

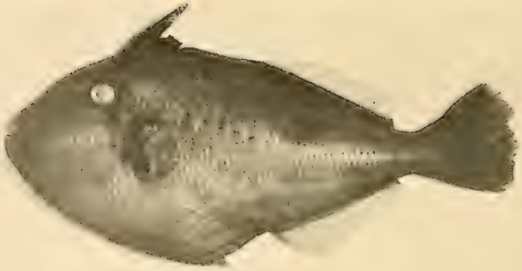

FIG. 4. BALISTES FUSCOLINEATUS SP. NOV.

**664. Balistes fuscolineatus** sp. nov. Fig. 4.

Head 3.50 into length, exclusive of caudal; depth 2; eye 4.50 into head; interorbital 2.50; D. III, 32; A. 29. Scales: Body and head entirely covered with medium-sized scales, ctenoid and scute-like, about 57 on a line from orbit to caudal, 16 in a series from base of pectorals to gape of mouth; six or seven enlarged scute-like plates just back of gill openings. The centre of the scales on the caudal peduncle is slightly raised, forming about five short, roughened lines. Teeth: A single series of white uneven cutting incisors in each jaw—eight in upper. A distinct groove in front of eye. Fins: The ventral spine is immovable, except at tip, the membranous portion of the ventral does not reach beyond the spine. The first dorsal spine is very strong with four lines of barbs pointing down; the length of spine equal to snout; the second and third spines are very small, less than half the length of first. Caudal is slightly rounded, its middle ray 2 into head. Base of soft dorsal very little longer than base of anal.

Color in life: Silvery, with more or less opalescent reflections. Three narrow dusky lines extend from anterior margin of orbit horizontally forward over snout; another dusky line over snout just above upper lip; two dusky lines over interorbital space; two rather indistinct dusky lines along base of dorsal fins, the lower of these lines beginning at orbit; also a narrow indistinct dusky line extends from posterior margin of orbit obliguely back and down to slightly above anal fin; another short dark line from upper posterior edge of orbit to axis of pectorals; two narrow dusky lines extending along bases of ventrals and anal fins. Spinous dorsal black; soft dorsal, pectorals, ventral spine, and anal fin white; caudal dusky. Color in spirits: Similar, excepting the dusky lines are less distinct.

Two specimens. Length 3–5.50 inches. Honolulu, October 20, 1901. *Hab.* Hawaiian Islands. Type of species is No. 664, B. P. B. M.

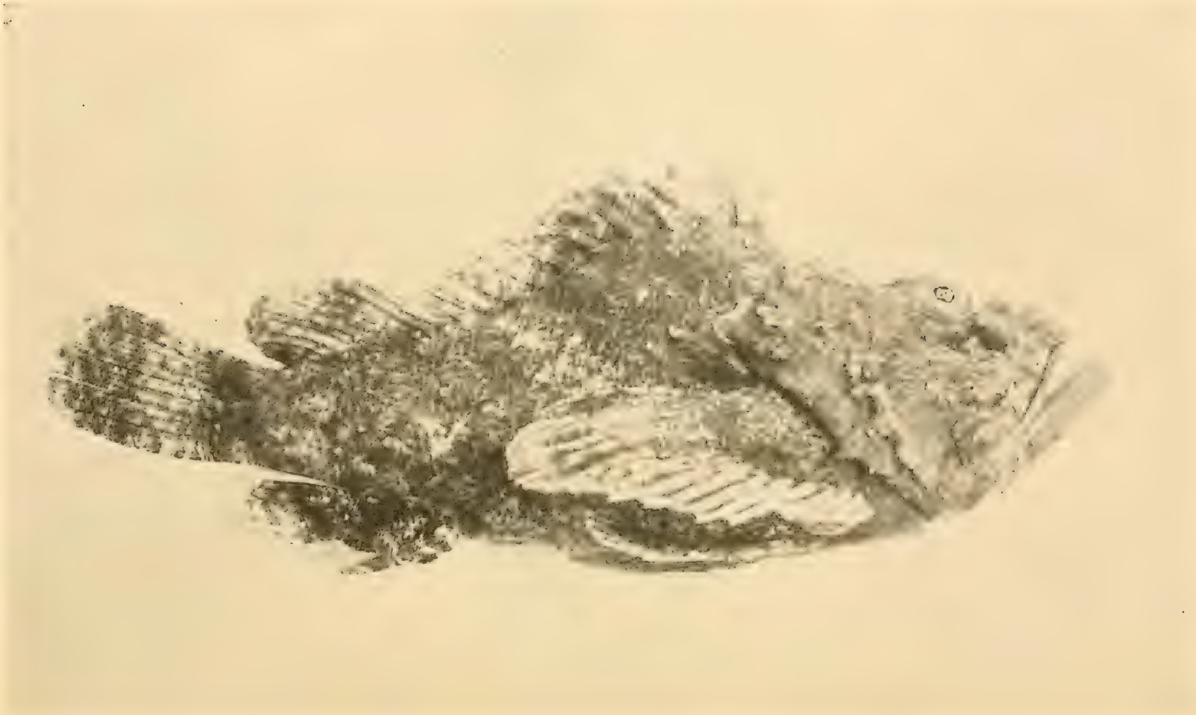

FIG. 5. SCORPAENOPSIS COCOPSIS JENKINS.

### 666. **Scorpaenopsis cocopsis** Jenkins.* Fig. 5.

Head 2.45, exclusive of caudal; depth 2.75; eye 6.20 into head; snout 3; interorbital 4; D. XII 10; A. III 5; V. I–5; P. 18. Scales of moderate size, 44 in lateral line. Head naked, but with many spines and dermal flaps; there are also many dermal flaps all over the body. Teeth villiform in jaws and vomer; no teeth on palatines. A deep fossa below anterior of orbit; interorbital and nauchal regions also deeply concave. Conspicuous dermal flaps just posterior of and overhanging anterior nostril, with a cluster of three spines just above them. Premaxillaries reaching to below hind margin of eye, 1.85 into head. About 12 spines on each side of nauchal fossa, and about 12 on each side of the face, exclusive of the spines at posterior margin of opercle and preopercle. Fins: The caudal is rounded. The dorsal spines are strong, the fourth is the longest, being equal to length of snout; the second anal spine is the longest, 2.88 into head. The base of the anal is contained 3.75 into base of dorsal. Pectorals very large, the upper six rays branched, the longest ray 1.50 into head; the base is 2 into head. Ventrals 1.88 into head.

Color in life: A mottled grayish and dusky, some specimens with reddish. A large dusky splotch covering the highest part of the back from nauchial region to seventh dorsal spine, and down on sides to axis of body; the belly is covered with fine vermiculations of brownish; there is a lighter area on sides of caudal peduncle. The fins are gray, specked and mottled with dusky; a broad submarginal band on caudal somewhat darker; a dark splotch on anterior and posterior of soft dorsal; a black band at base of caudal. The simple rays of the pectorals are yellow, banded with dusky; the branched rays have a dark area near their base. The under surface of the pectorals are yellowish white, with a black band on the middle of the branched rays, and a black area in the axis. The upper surface of the ventrals is almost uniform brown tipped with white. Two specimens. Length 8–9 inches. Honolulu, October 19, 1901. *Hab.* Hawaiian Islands.

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* Dr. Jenkins' description of this species was received just as this MS. was going to press. It was thought best to let the description go in, as there seems to be a few slight variations in coloring, etc.

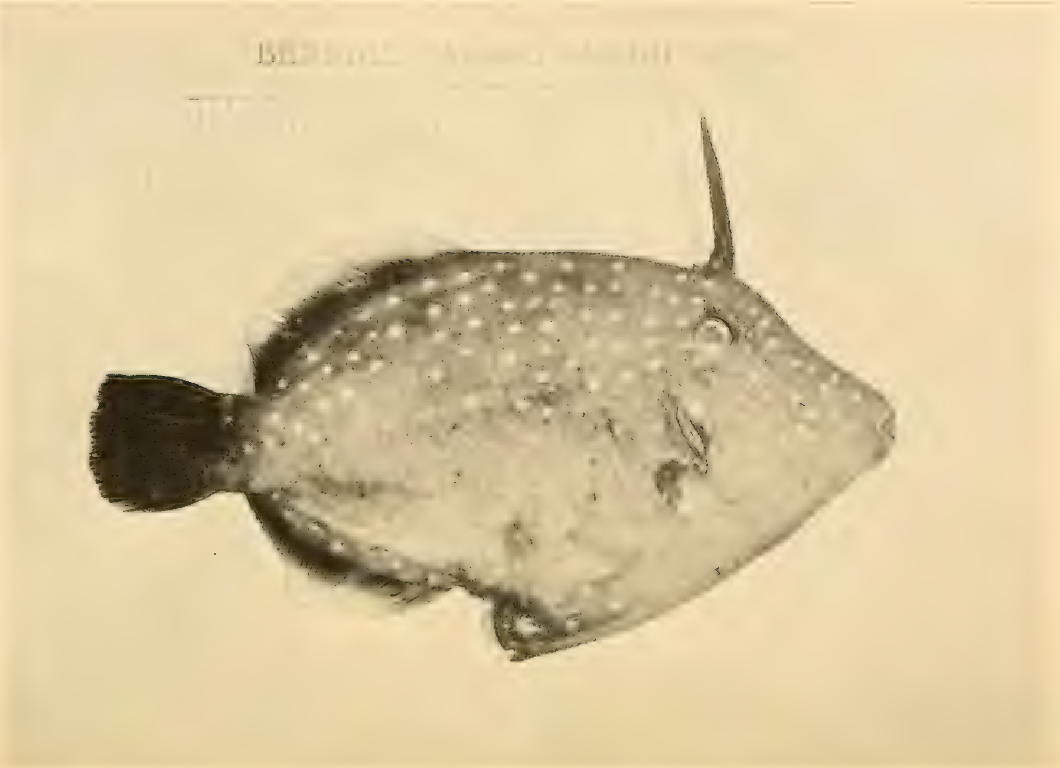

FIG. 6. MONOCANTHUS ALBOPUNCTATUS SP. NOV.

**667. Monocanthus albopunctatus** sp. nov. Fig. 6.

Head 3 into length, exclusive of caudal; D. II, 38; A. 33; P. 15; eye 5 into head; snout 1.20 into head, its profile concave. First dorsal spine long and strong, about equal in length to snout, and with four rows of small barbs directed down; the insertion of the spine is directly over anterior half of eye. Teeth: Uneven cutting incisors in each jaw; a single row of three on each side of lower jaw; an additional row of small inner teeth in upper jaw. Caudal peduncle with four short round spines on each side. Skin without distinct scales, everywhere rough with a velvety feeling to the touch. Fins: Caudal rounded, its longest ray 1.75 into head. Ventral spine coalesced to the pelvic bone, the membrane rather well developed, extending slightly beyond the spine. Dorsal and anal rays of about equal length; the base of the anal is contained 1.20 into base of dorsal; pectorals short, 2.50 into head.

Color: Light gray, with slight silvery gloss everywhere covered with scattered round white spots about size of pupil. On the lower half of fish there are also a small number of scattered black dots, smaller than the white dots. Dorsal and anal with the basal fourths black, the remaining yellowish white. Caudal dusky. Iris yellow.

One specimen. Length 6 inches. Honolulu, October, 1901. *Hab.* Hawaiian Islands. Type No. 667, B. P. B. M.

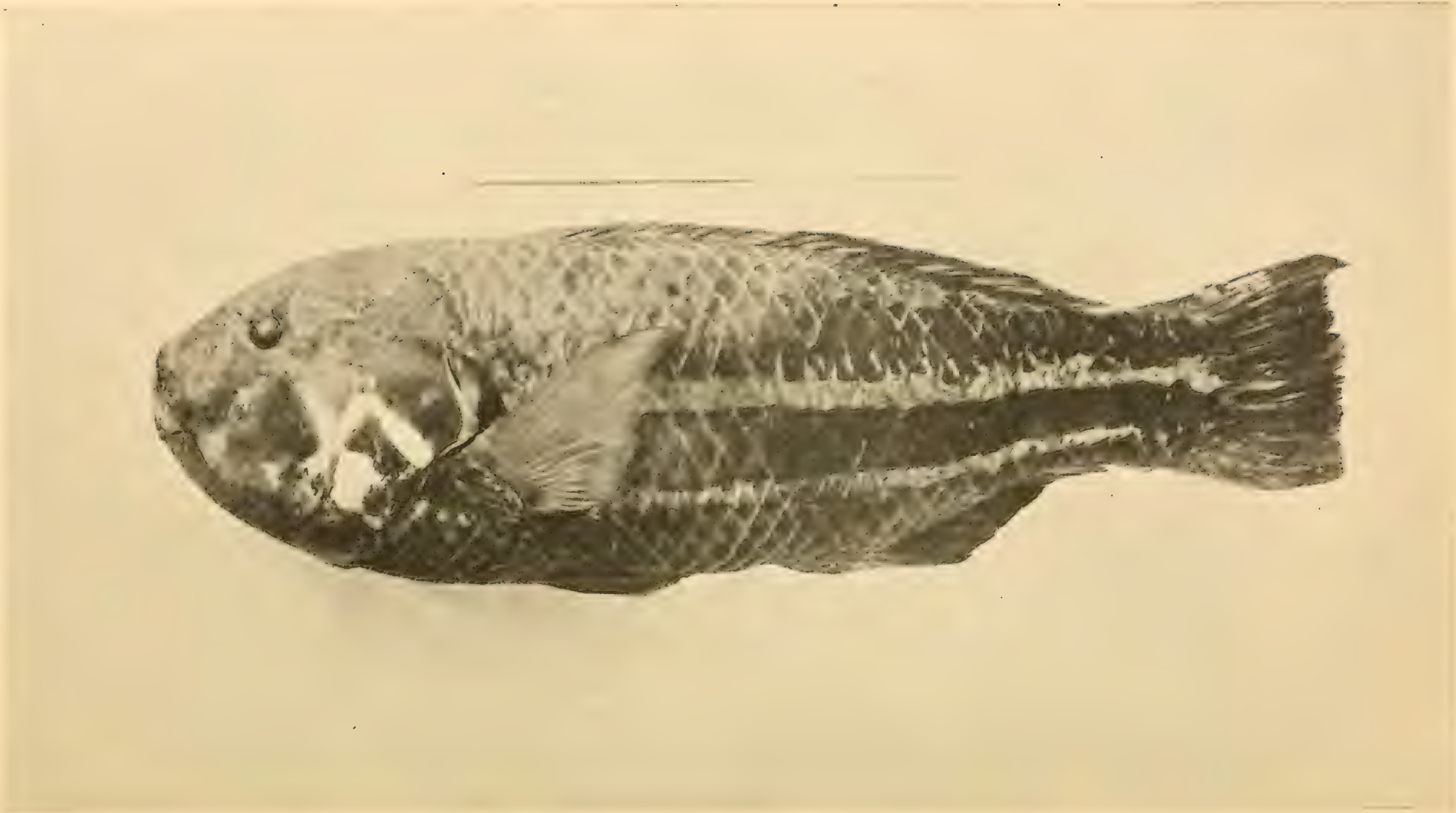

FIG. 7. THALASSOMA BERENDTI SP. NOV.

**681. Thalassoma berendti** sp. nov. Fig. 7.

Head 2.80 into length, exclusive of caudal; depth 2.80; eye 9 into head; snout 3 into head; interorbital 4. Scales: The scales are very large, cycloid, 3-27-9; head naked; lateral line continuous. D. VIII 13; A. III 12; V. I–5; P. 14. Teeth: A single row of round canines in each jaw, the two anterior ones enlarged; no canines at angle of jaw. Fins: Dorsal low, the spines rather weak; ventral small, 2.50 into head, and situated below base of pectorals; longest ray of pectorals 1.50 into head; caudal almost square, with its outer rays slightly produced. Base of anal 2 into base of dorsal.

Color in life: Ground color pea green, bluish on belly and chin; three wide, bright red lines, as wide as eye, from head to caudal, the upper one more or less disconnected; the lower one beginning at lower axis of pectorals, extends to lower third of caudal; the second extends from opercular flap to a little above middle of caudal; the upper line extends along base of dorsal. A broad wedge-shaped red line extends from lower posterior maggin of orbit obliquely back and down on sides of head, dividing into two on posterior edge of preopercle and extending to lower posterior edge of opercles. A red triangular spot on each side of snout. A row of six round red spots just below base of pectoral fins. Dorsal red at base, a dark green line through middle and the outer half of fin bright green. Anal is similarly colored. Ventrals green. Caudal green, the middle yellowish. Pectorals bluish green. In spirits the fish becomes greenish blue; the red markings become whitish.

One specimen. Length 14.50 inches. Honolulu, October, 1901. *Hab.* Hawaiian Islands. Type No. 681, B. P. B. M.

*Ordered printed October 11, 1901.*

# OCCASIONAL PAPERS

OF THE

# BERNICE PAUAHI BISHOP MUSEUM OF POLYNESIAN ETHNOLOGY AND NATURAL HISTORY.

Vol. I.—No. 5.

## Director's Report for 1901.

HONOLULU, H. I.
Bishop Museum Press.
1902.

Smithsonian Institution
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# OCCASIONAL PAPERS

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Vol. I. — No. 5.

# Director's Report for 1901.

HONOLULU, H. I.
Bishop Museum Press.
1902.

*To the President and Trustees of the Bernice Pauahi Bishop Museum.*

*Sirs:—In accordance with the vote of the Trustees at the stated meeting held January 13, 1900, I present my report of the condition of the Museum and the work done in the various departments during the year 1901.*

*WILLIAM T. BRIGHAM,*
*Director of the Museum.*

*Honolulu, March 19, 1902.*

# REPORT.

THE difficulty mentioned in my last Annual Report, relating to the absence of sufficient case room, has continued through the year, but it is hoped that a few months more will put an end to a condition seriously impeding the progress of the Museum. No new collections of great importance have been received during the year, although single specimens have come in by gift and some important ones by purchase; among the latter the fine specimen of Sperm Whale (*Physeter macrocephalus*) which was ordered by the Trustees some two years ago. It was then considered that as Honolulu owed much of its early prosperity to the whaling industry which at one time made this port the centre of its operations in the Pacific it would be desirable to have specimens of the seven or more species of whale formerly caught in these waters. As a beginning, the Wards Natural Science Establishment at Rochester, N. Y., was commissioned to procure as fine a skeleton of a sperm whale as possible, and to not only mount this carefully as a skeleton, but following the suggestion of the late Sir William H. Flower of the South Kensington Museum, prepare a covering of suitable material to represent the actual appearance of the living whale so far as possible. As this covering extends over only a longitudinal half, inspection of the bony structure is in no wise hindered; and as the whale is now hung in Hawaiian Hall about on a level with the upper gallery it is in a very favorable position for examination. The specimen is a full grown male 55.7 feet long. The skull alone is 18 feet long, 8 feet wide and 6 feet high, weighing 6000 pounds. The lower jaw, which contains 50 teeth, weighs only 900 pounds. The framing of the skeleton is very skilfully done, two strong steel rods piercing the body of the vertebræ and holding the spine in rigid curvature. It is believed that there is no better or more instructive specimen in the United States. Illustrations both of the skeleton and of its covering are herewith given. Figs. 1, 2 and 3. It is hoped that soon a similar specimen of the Right Whale may be placed on the opposite side of the Hall.

Also by purchase a skeleton of a smaller whale, 17.6 feet long, from New Zealand (*Mesoplodon grayi*) has been obtained and well cleaned and mounted by Mr. Bryan of the Museum staff. It is well shown in the accompanying illustrations, Figs. 4-8, and as it is not a common specimen, the skull has been photographed as well as the ear bones. It presents features in common with the description of another species of Mesoplodon and in the absence of material for comparison the determination of its specific place is not certain.

As far as possible in the absence of cases the work of preparing the bird groups has gone on, and a fair illustration of one of the larger groups is given in Fig. 9, where Mr. Bryan has, as it were, taken a section of the rocky breeding place of the Tropic bird. Eggs, young and adults are all skilfully shown, and our thanks are due to Mr. F. M. Swanzy for permission to secure the needed specimens from the islet Mokolii. For the smaller birds a different but not less effective treatment is shown in Fig. 10. This is certainly much more attractive and truer to Nature than the old method of mounting stiffly on stands. Twenty-seven such groups are planned for the Hawaiian avifauna.

The grass house mentioned in my last report has been completed and furnishes a very satisfactory illustration of an ancient grass house of the simpler sort. It will be fully described and illustrated in the account of Hawaiian house building which it is proposed to publish in the Museum Memoirs. It may be said here, however, that it is large enough to live in, and not a mere model, and it has been constructed in the ancient way, except that the human sacrifice was not deemed necessary, from the frame of an old house in a valley on Kauai, and this was given by the Knudsen

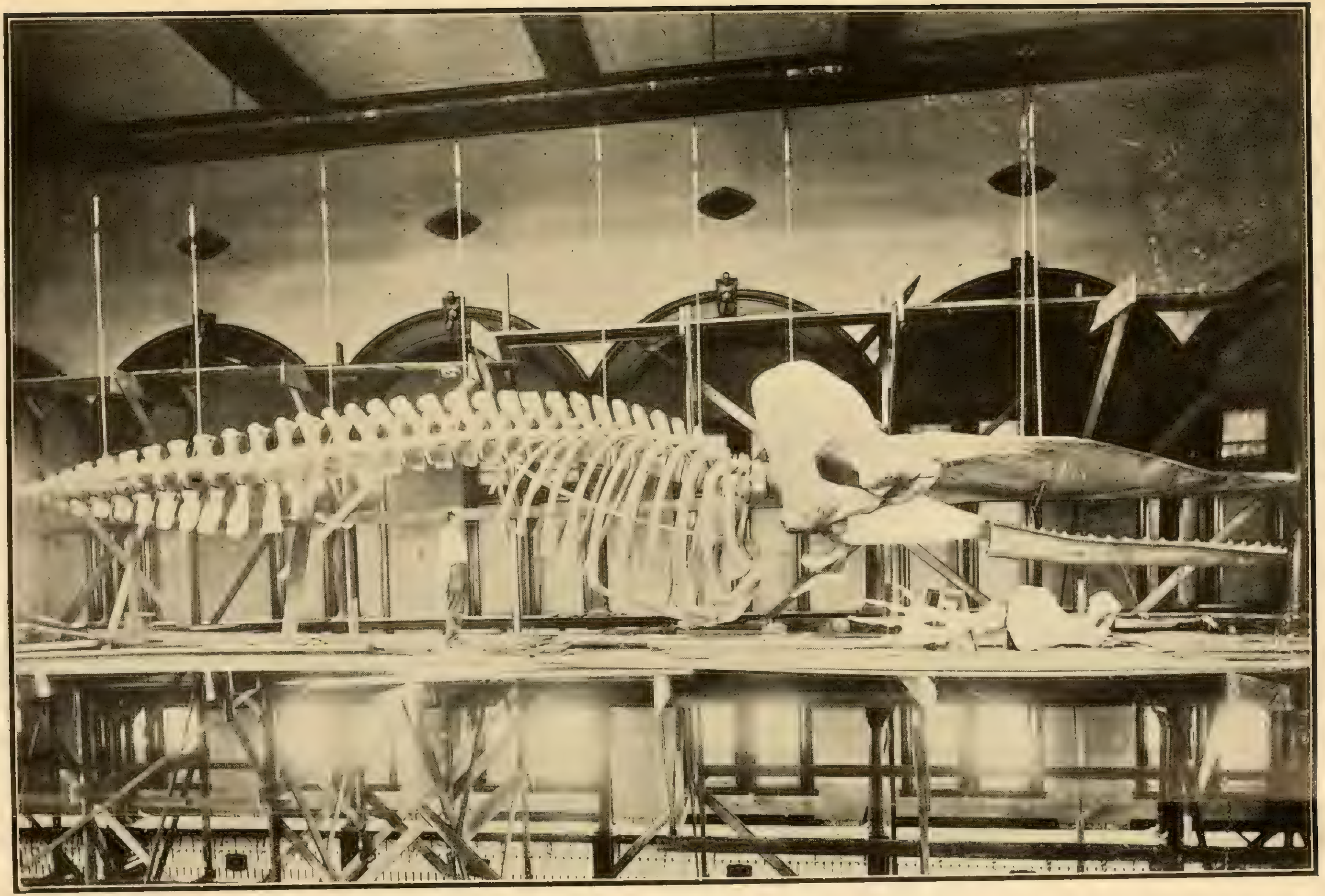


FIG. I. SKELETON OF PHYSETER MACROCEPHALUS.

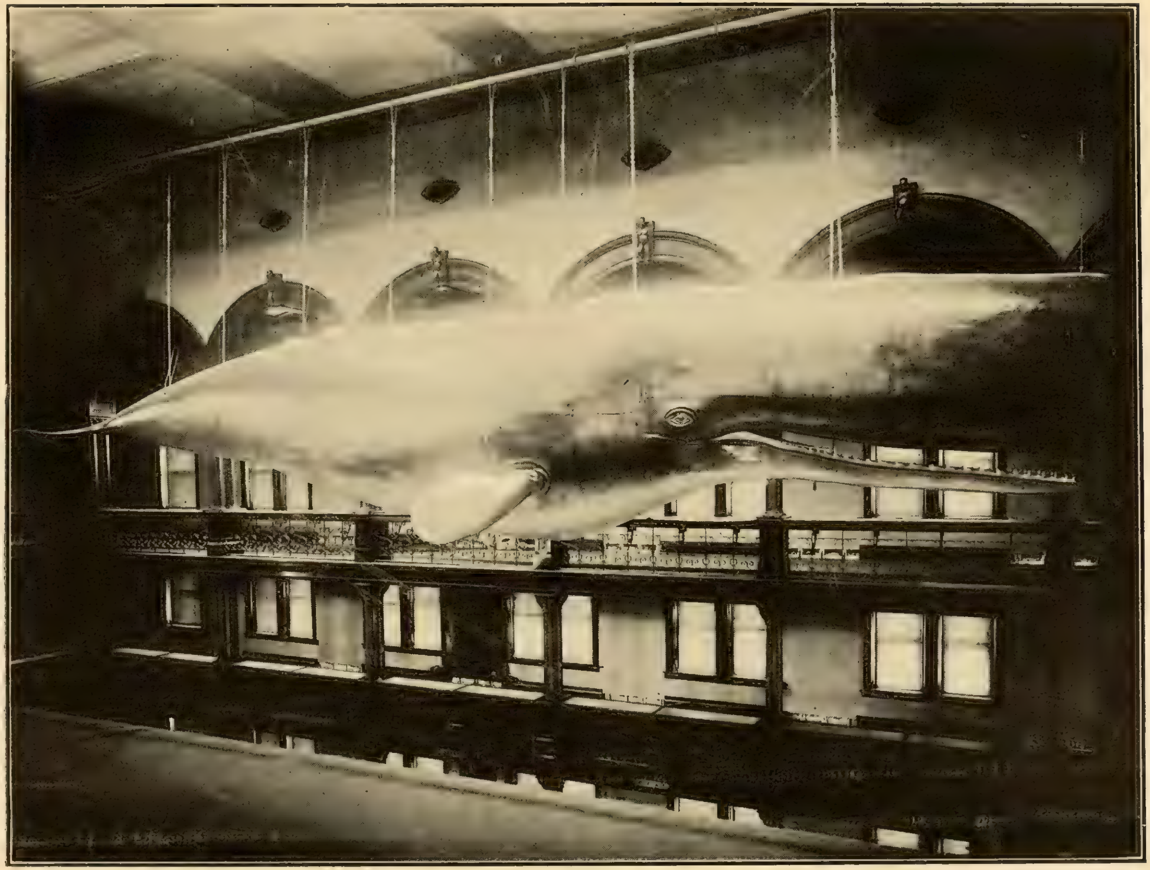


FIG. 2. PHYSETER MACROCEPHALUS AS HUNG IN HAWAIIAN HALL.

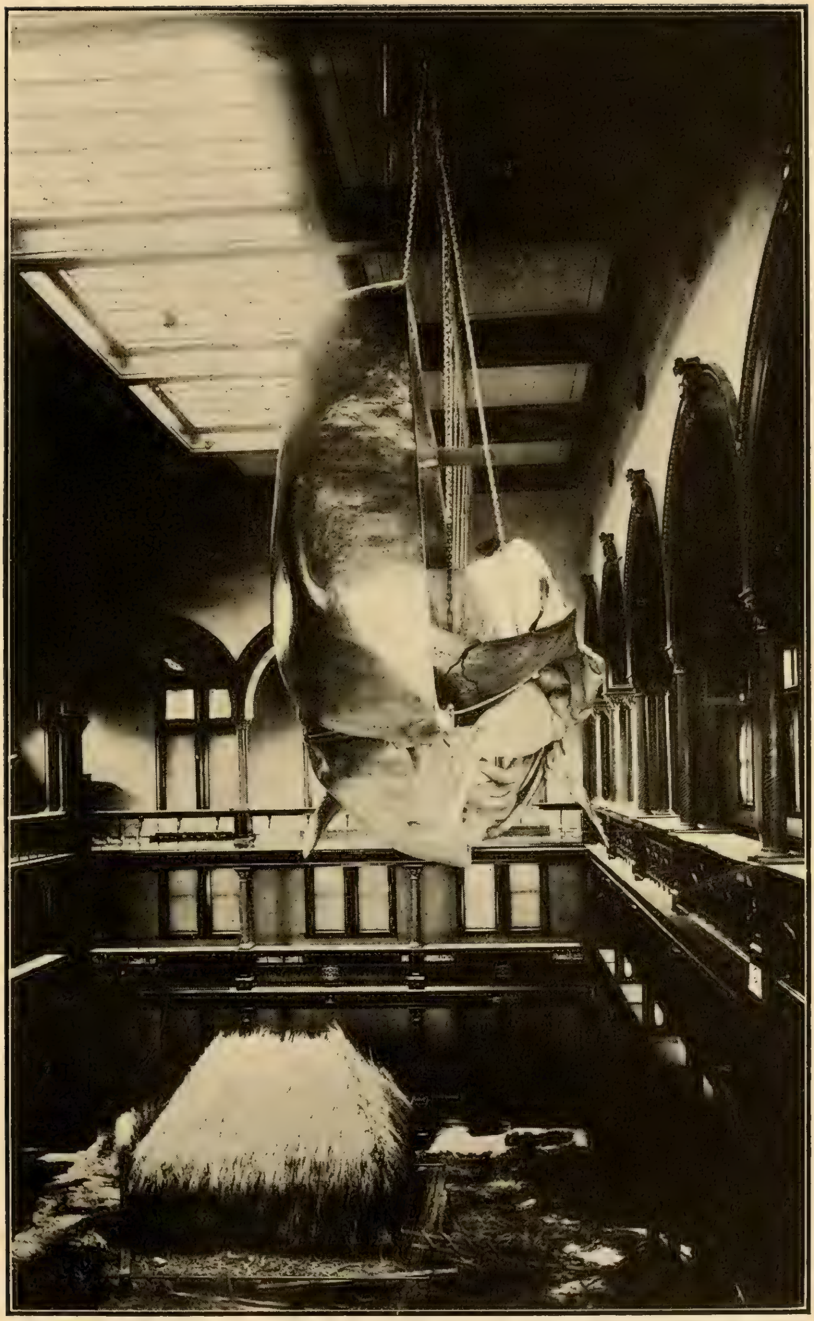
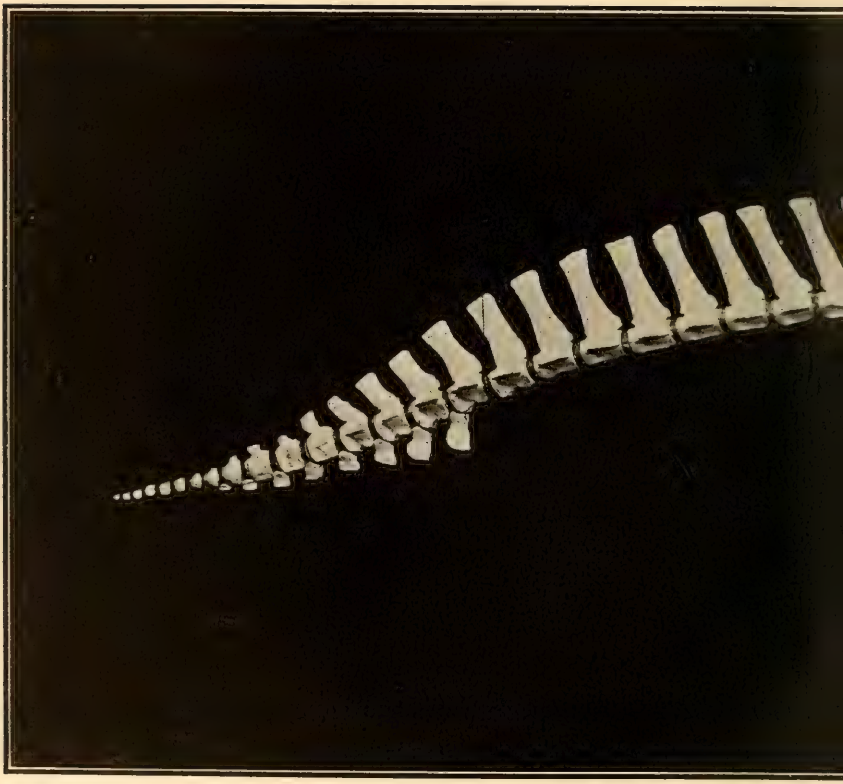


FIG. 3. END VIEW OF SPERM WHALE.



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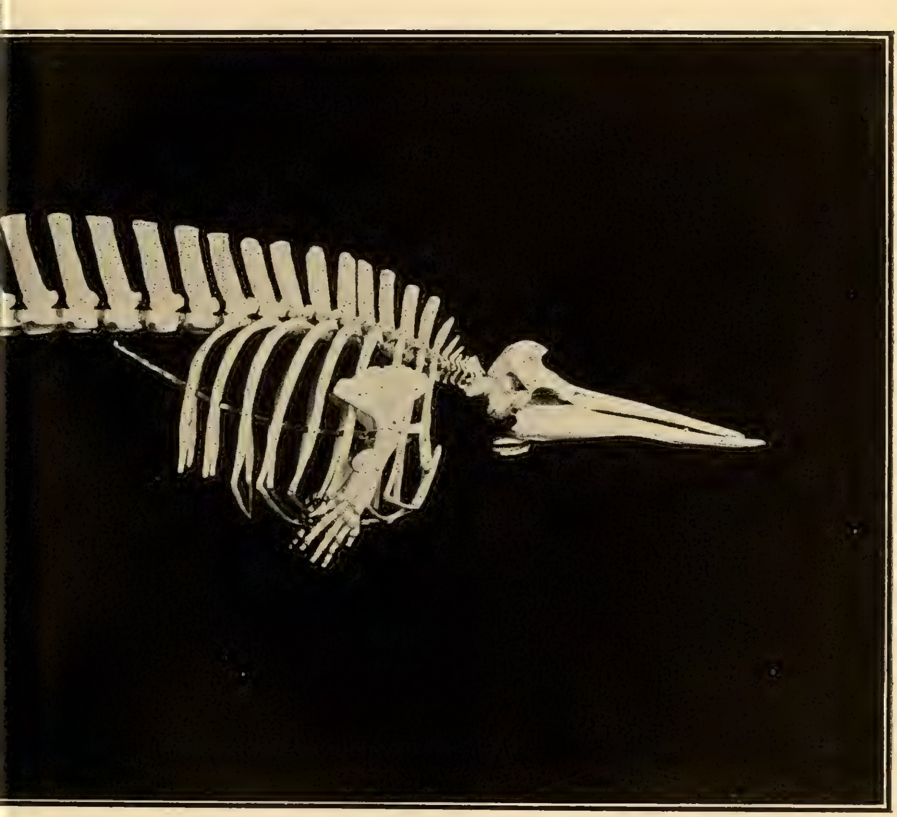

PLODON GRAYI.

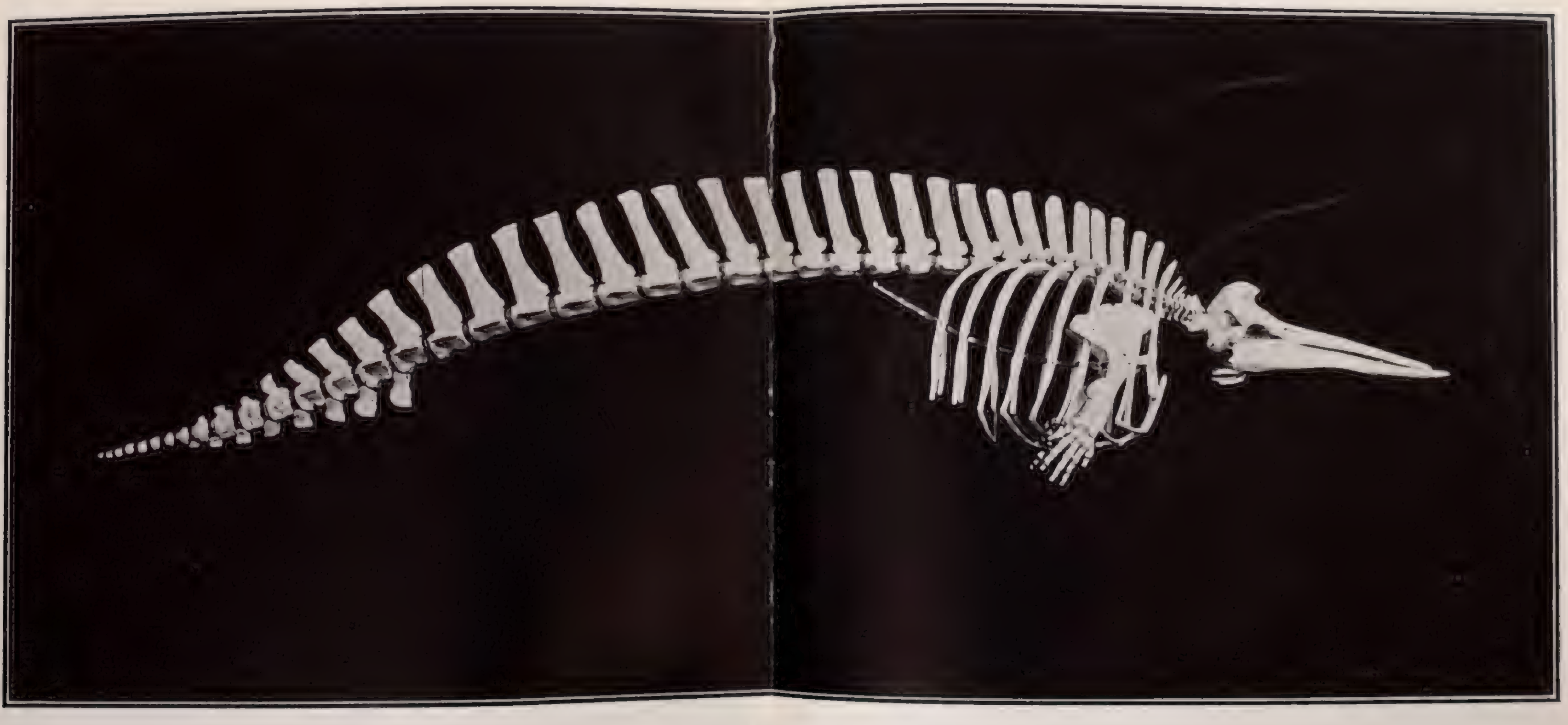

FIG. 4. MESOPLODON GRAYI.

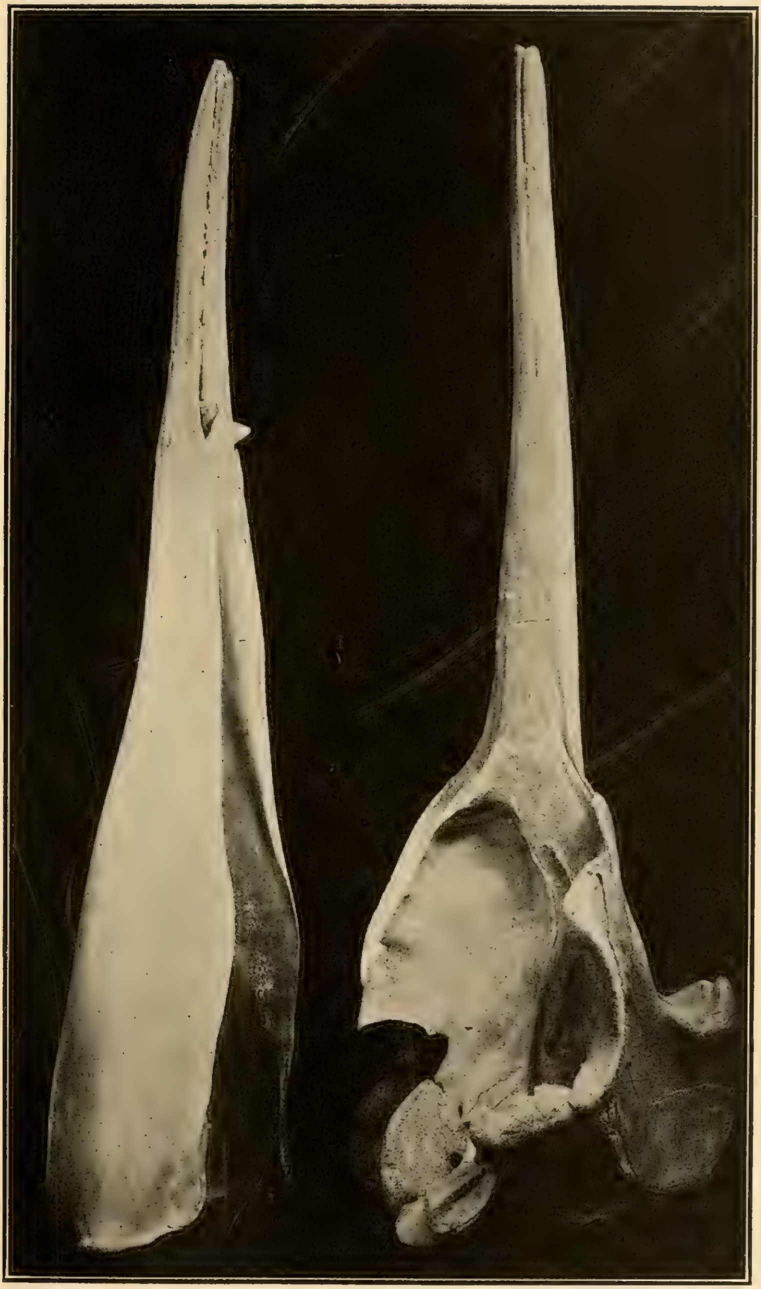

FIG. 5. SKULL OF MESOPLODON (SIDE VIEW).

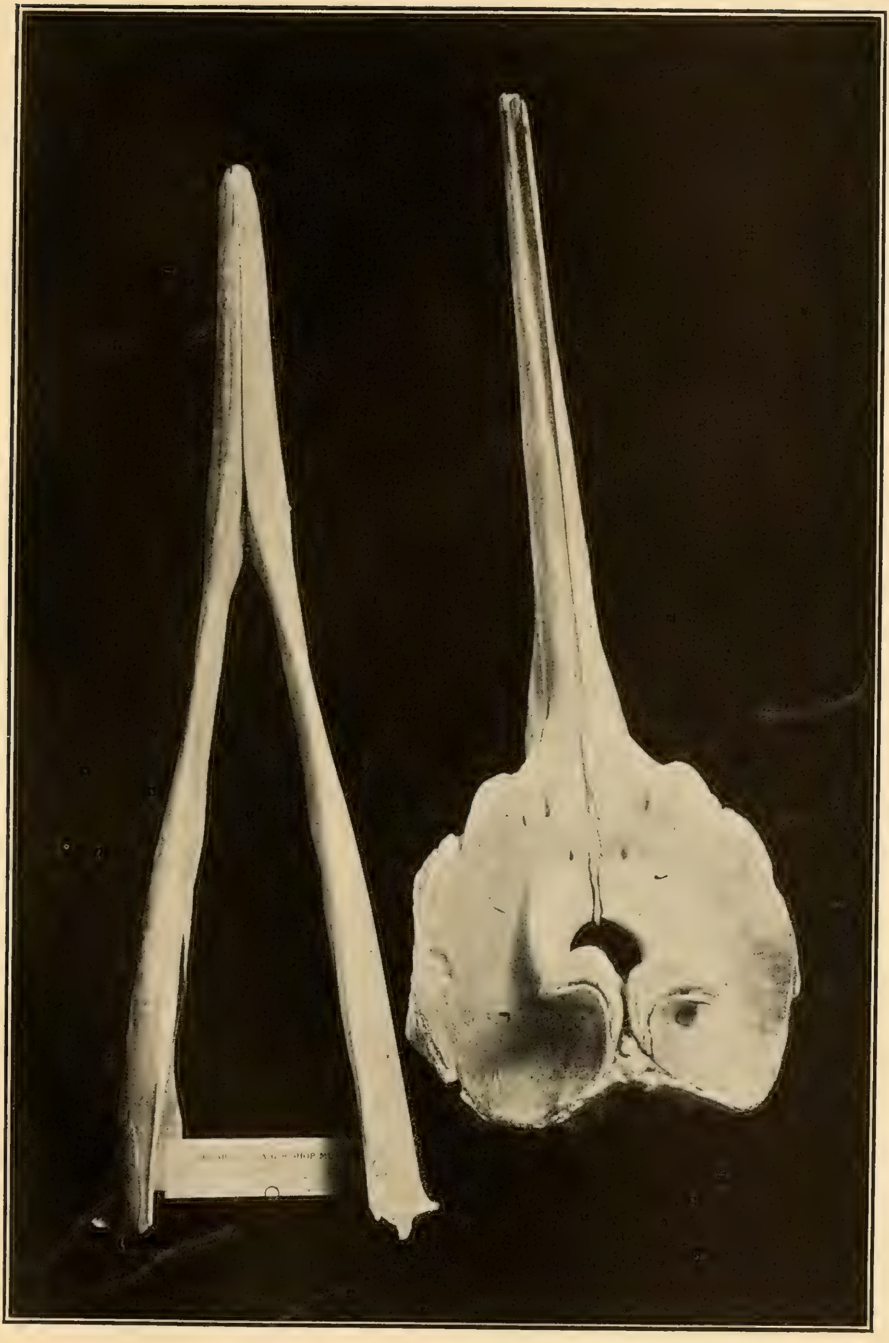

FIG. 6. SKULL OF MESOPLODON (FROM BELOW).

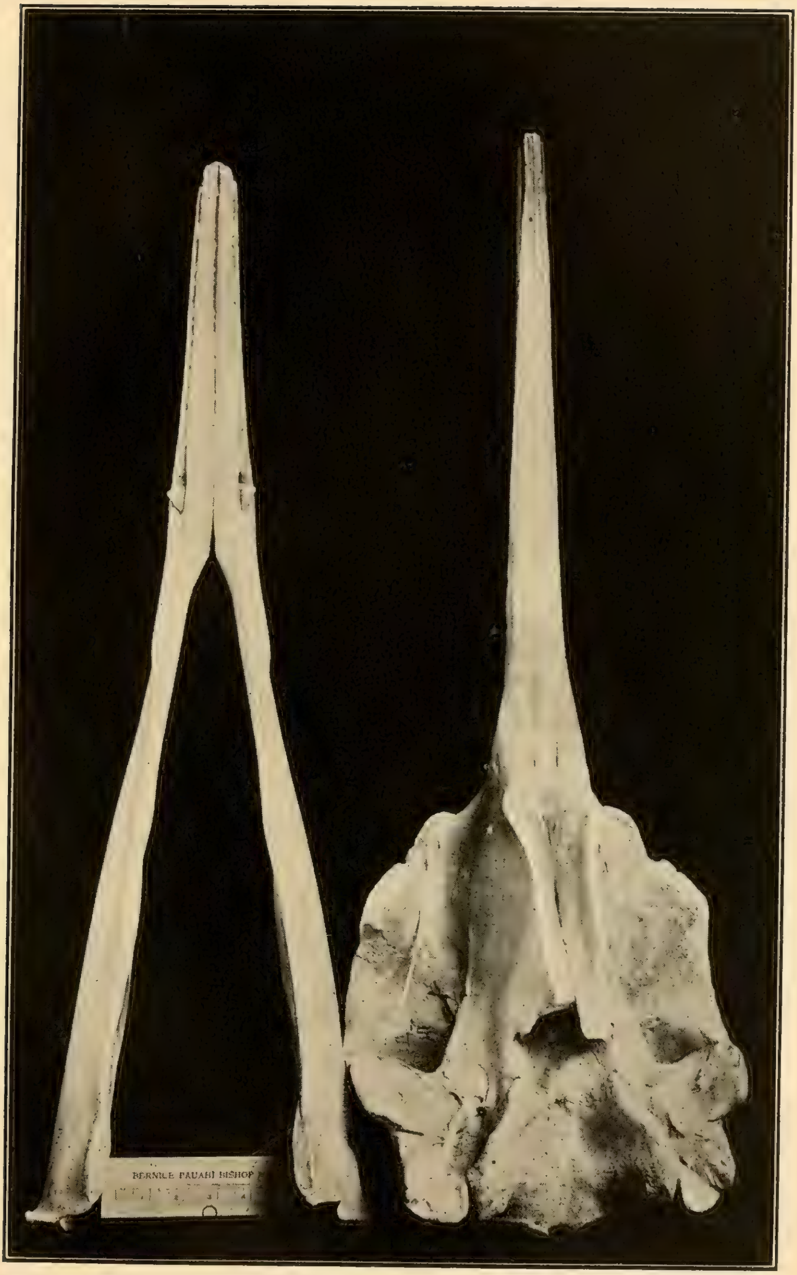
BERNICE PAUAHI BISHOP

FIG. 7. SKULL OF MESOPLODON (FROM ABOVE).

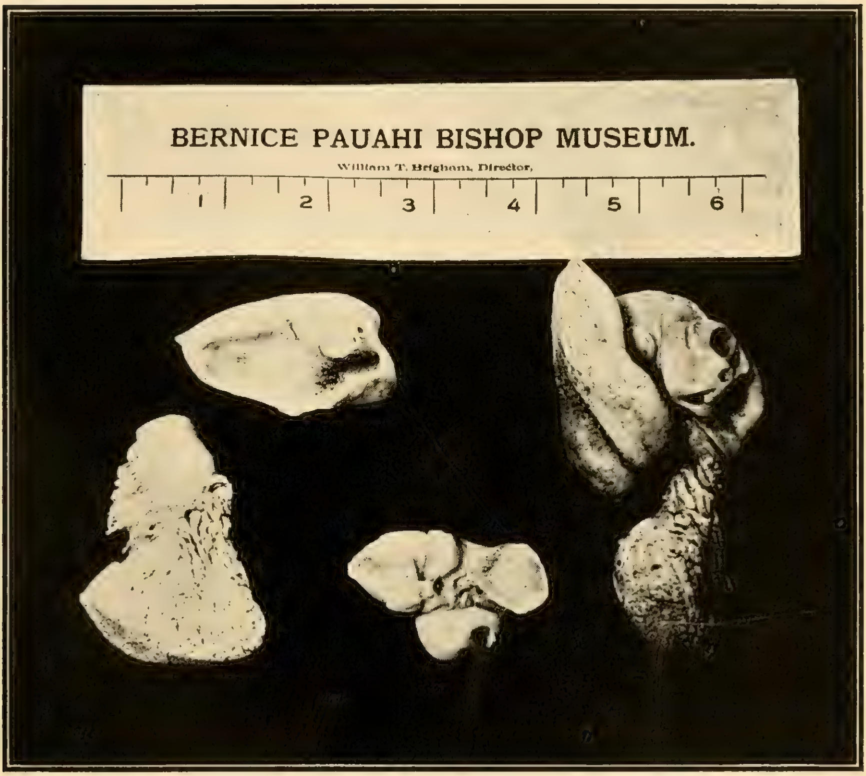
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FIG. 8. EAR BONES OF MESOPLODON.

Estate. This frame was cut by stone tools from the hardest and most durable of Hawaiian woods, as *naio* and *kauila* and *uhiuhi*, so that while the ends buried in the earth show signs of decay the part exposed to the air is fresh and complete as when made so many score of years ago. The frame has been bound together by braid of *ukiuki* leaves and the thatch of *pili* grass attached by the same means.

Mr. Stokes has, during the year, nearly completed his admirable model of the Wahaula heiau which is to be exhibited in Hawaiian Hall. As this ancient temple was the last one actually used in the former worship, and is in a situation remote from the present population, and unsuited to the cultivation of sugar cane, it has been possible to secure most of the original construction, or rather (as it was rebuilt several times by chiefs of Hawaii) of the construction last used for worship. Mr. Stokes and the Director spent some time camping in the heiau making careful measurements and photographs, from which Mr. Stokes has built with the very stones of the temple, what I consider a very accurate representation of an ancient heiau. Mr. Bryan has added with great skill a miniature grove of coconut trees.

Mr. Walcott has completed the great task of rewriting the accession book, comparing each specimen with the description and number in the most painstaking manner. He has also arranged the very extensive card index of contemporary zoölogical literature of the Concilio Bibliographico of Zurich.

Mr. Thompson has made many casts of the Hawaiian fishes, and already the collection stored in Hawaiian Hall is a most interesting and beautiful illustration of the Hawaiian fish fauna; one that we should hope to complete. Mr. Thompson's work received the emphatic approval of the gentlemen of the United States Fish Commission, and I doubt if so good representations of fish can be found in any museum. Few persons can have a just idea of the variety and beauty of the Hawaiian fish as shown in this work. The necessary removal and partial demolition by storm of Mr.

Thompson's workshop has caused considerable loss of casts and no little delay in his work.

During the year the Museum Printing Office has been constantly employed, and the typographical beauty of the publications attests the skill and industry of our one printer. Bryan's Key to the Hawaiian Birds has been issued as Memoir No. 3, and besides the Annual Report, a description of new Hawaiian Fishes by Mr. Seale as No. 4 of the Occasional Papers. Memoir No. 4, on Hawaiian Stone Implements, is more than half printed and will be issued in the first half of 1902. The demand for the publications has increased in a gratifying manner.

Late in the year Mr. Seale started on his second expedition, this time to the southeastern Pacific. He has already spent a month on Makatea, of the Paumotu archipelago, where he made photographs and notes of the process of kapa-making, as this island was once the centre of the kapa industry in the Paumotus, but now has quite given up the interesting manufacture, although Mr. Seale found skilled old women who made kapa for him. Evidently it will not be long before, the old women gathered to their fathers, the art will be lost. A considerable collection of fish was made in Tahiti, and from that island our explorer will proceed to the Tubuai, Gambier, Hervey, Marquesas, Samoan groups, whence we are looking for abundant treasures on his return.

In the Ethnological department the acquisitions are fully shown in the list appended. In the other departments of Natural History the gentlemen in charge have prepared similar lists.

## REPORT ON THE LIBRARY.

TO THE DIRECTOR:—

During the year 1901 the library of the Museum has been increased by the addition of 299 volumes and 530 parts and pamphlets acquired principally by exchange of publications, also by gift and purchase.

Since the foundation of this library efforts have been made to secure all the available material relating to the early voyages in

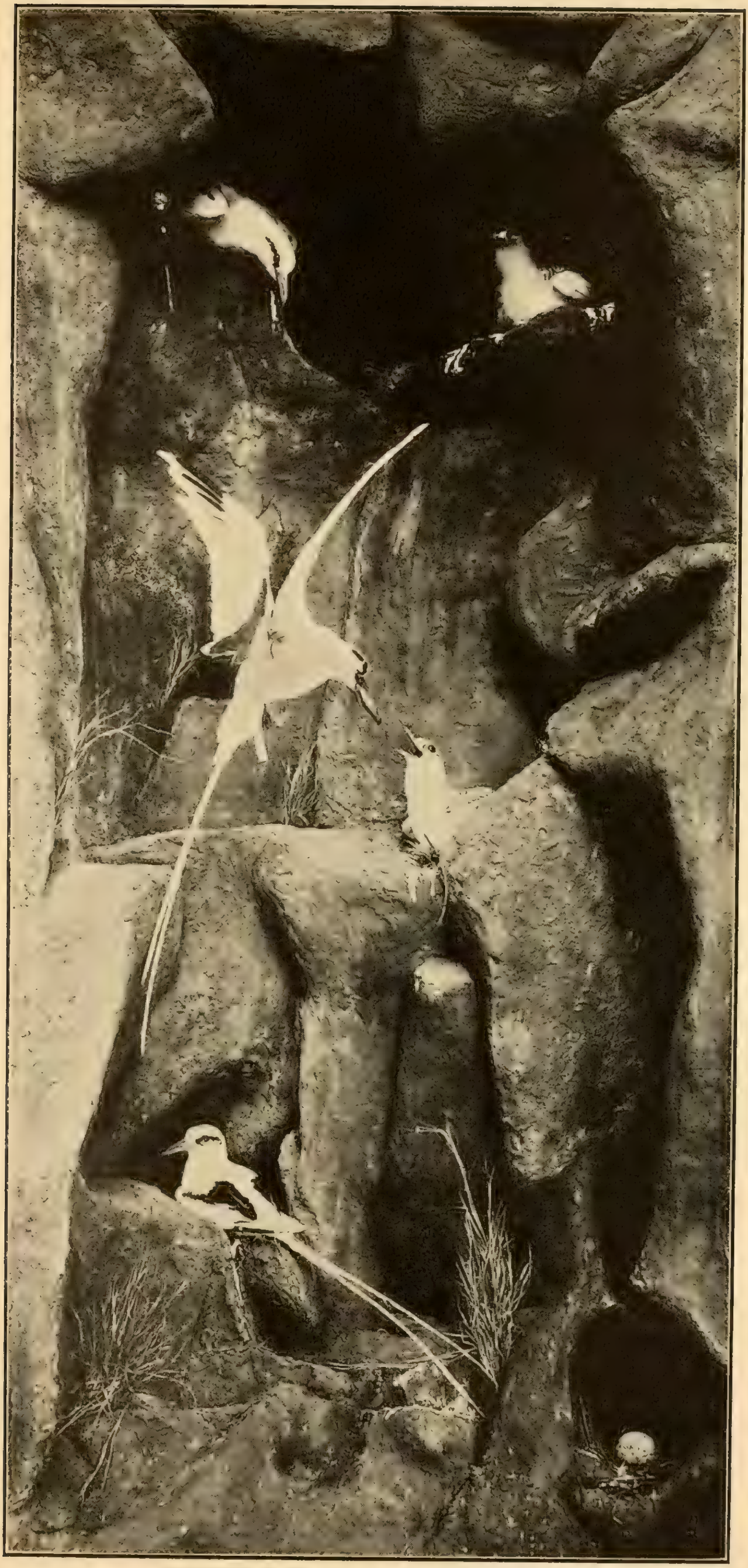

FIG. 9. GROUP OF TROPIC BIRDS.

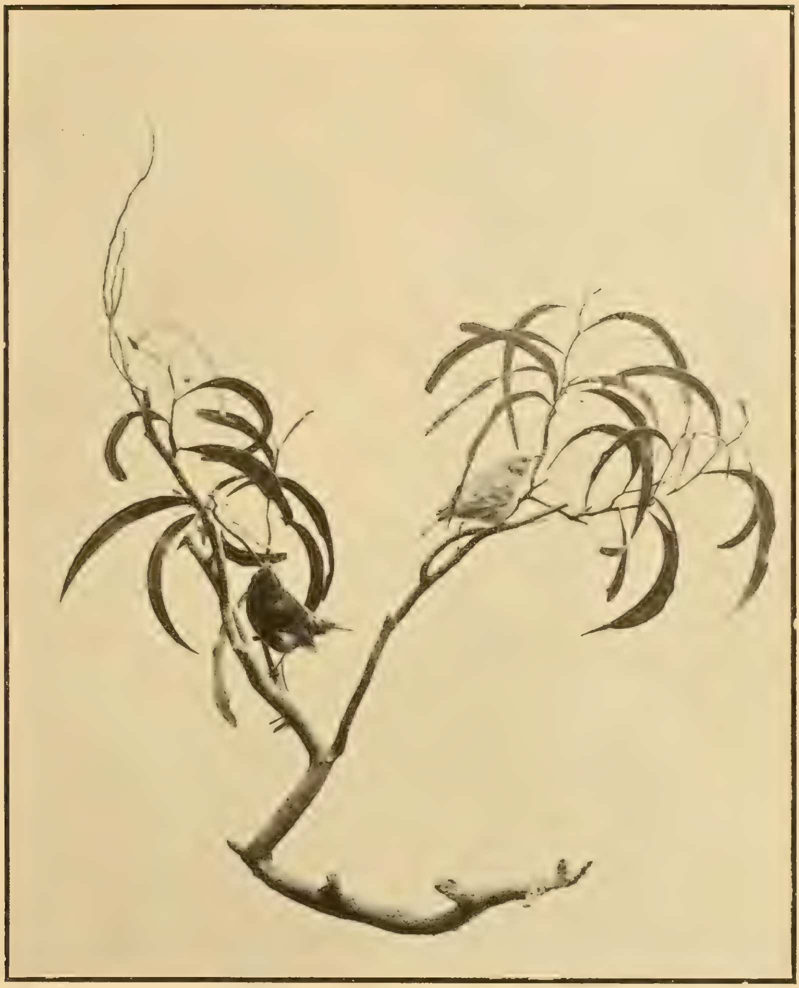

FIG. 10. BIRDS ON KOA BRANCH.

the Pacific ocean, and by closely watching the catalogues of the book dealers in Europe, which are promptly mailed to the Museum, and through the reports of our appointed book agents in London and Berlin, many old and rare volumes have been gathered. In the year under review but five books of voyages were picked up, and these are: Dampier's Voyages, Burney's History of Discoveries in the Pacific, Fleurieu's Discoveries of the French, Flinder's Voyage in the Investigator, and Bligh's Mutiny of the Bounty. These volumes all but complete the long series in the Library referring to the subject.

Considerable active study and investigation by the departments of Ornithology and Ichthyology called for a fuller representation of books pertaining to such studies, and complete sets of the Ibis and Auk being offered for sale in London they were purchased, as well as a set of the Journal für Ornithologie in Berlin. To aid the determination of the fishes Bleeker's Atlas Ichthyologique in nine folio volumes was purchased; and from the United States Fish Commission and Dr. O. P. Jenkins, the Fishes of Puerto Rico by Evermann and Marsh, with several other pamphlets published by the Commission have been gladly received.

Few works relating to Ethnology and Anthropology were added during the year as compared with 1900, when files of publications from several European societies were purchased. The Societá Italiana di Antropologia e Etnologia was among those whose early publications were bought, and has completed its set in the Museum by adding the four volumes of most recent date. Several institutions with whom exchange of publications has been conducted have very kindly contributed many of their early volumes not due the Museum by right of exchange, and a grateful acknowledgment is tendered the Cambridge Museum of Comparative Zoölogy, the Academy of Natural Sciences of Philadelphia, Field Columbian Museum, Royal Society of Victoria (Australia), and the Real Academia de Ciencias y Artes de Barcelóna for these appreciated gifts.

Books have also been received from Henry C. Carter, Esq., of New York, who has presented many books long out of print concerning this region; the Hon. Charles R. Bishop, the U. S. Treasury Department, U. S. Department of Agriculture, the U. S. Geological Survey, and other individuals and institutions mentioned in the accompanying list of acquisitions. To the list of exchanges many new names were added, and it is pleasing to remark the increase of offers from other scientific bodies to exchange publications. The exchange list is appended.

The condition of the books is good although continually threatened by inroads of insects which breed uninterruptedly in our even climate, and considerable difficulty is experienced in fighting these pests owing to the crowded state of the shelves and the want of suitable and permanent cases. While the library remains as it is, stored in the old cases in the basements, these disadvantages will only be overcome by great expenditure of time and labor. The arrangement and classification of the Library also suffers through the same over-crowding, and it is to be hoped that the new cases to be placed in Hawaiian Hall will soon arrive and be erected. At present, to provide room it is found necessary to box those books for which there is less call, and store them in other parts of the Museum.

The Library was established for assisting the Museum staff in researches, but free use has also been offered to and taken advantage of by scientific gentlemen in these islands who have come to the Museum for study. Respectfully,

JOHN F. G. STOKES,
Acting Librarian.

## ATTENDANCE OF VISITORS.

If it were possible to make a table of the apparent intelligence of the visitors the results would be most interesting. I do not think any visitors study the collections more carefully than the Chinese. The Hawaiian attendance is largely of school children, and the Portuguese and Japanese is mostly from the laboring classes. Some visitors not only stay all day but come repeatedly, while the average tourist perhaps spends half an hour or less in a glance at the rooms, for the collections seem to them to be merely furniture to these. It will be seen that the Museum was open to visitors 150 days, or nearly half the time, omitting Sundays. No damage was done by any visitor, and all were orderly and observant of rules as in any community.

The attendance of school children perhaps needs some regulation that they may get the greatest possible good from their visits to the Museum and cause the least possible annoyance to the other visitors. Not more than twenty in a class, and not more than two classes at once should be allowed; and the teachers who come with them should be competent to give some instruction to the pupils.

At present, I am sorry to say, a visit to the Museum is much in the nature of a half-holiday to most of the children, and I have seen little instruction given by the teachers to the pupils: there are some marked exceptions.

TABLE OF ATTENDANCE.

| 1901. | Whites. | Hawaiians. | Portuguese. | Chinese. | Japanese. | Others. | Open on | | Visitors on other days. | Average Attendance. | | Total Visitors. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Exhibition. | Other days. | | Exhibition. | Other days. | |
| January ...... | 334 | 109 | 29 | 73 | 70 | 2 | 9 | 3 | 10 | 67.5 | 3.3 | 617 |
| February ...... | 460 | 78 | 34 | 126 | 42 | .... | 8 | 2 | 51 | 86 | 25.5 | 740 |
| March ........ | 597 | 170 | 16 | 111 | 88 | 4 | 10 | 2 | 17 | 97 | 8.5 | 986 |
| April .......... | 349 | 58 | 21 | 74 | 95 | .... | 8 | 7 | 45 | 69 | 6.5 | 597 |
| May .......... | 349 | 159 | 28 | 75 | 42 | 3 | 9 | 3 | 22 | 70.5 | 7.3 | 656 |
| June .......... | 369 | 175 | 25 | 98 | 67 | 1 | 9 | 3 | 49 | 76 | 16 | 735 |
| July .......... | 329 | 60 | 26 | 114 | 42 | .... | 8 | 3 | 64 | 63 | 21 | 571 |
| August ........ | 684 | 53 | 14 | 123 | 68 | .... | 10 | 7 | 152 | 79 | 22 | 942 |
| September .... | 256 | 114 | 21 | 91 | 44 | 1 | 7 | 5 | 53 | 68 | 10 | 527 |
| October ...... | 244 | 153 | 34 | 104 | 53 | .... | 8 | 5 | 15 | 70.4 | 3 | 588 |
| November .... | 320 | 130 | 47 | 94 | 109 | 8 | 10 | 3 | 24 | 68.4 | 8 | 708 |
| December ...... | 321 | 153 | 12 | 89 | 81 | .... | 8 | 3 | 32 | 78 | 11 | 656 |
| Totals ...... | 4612 | 1412 | 307 | 1172 | 801 | 19 | 104 | 46 | 534 | 74.4 | 11.8 | 8323 |

# List of Accessions.

## DEPARTMENT OF ETHNOLOGY AND ANTHROPOLOGY.

*Given.*

5621 Palm-leaf basket. Guam. Given by Lieut.-Commander Stoney.

5872-7 Bas-reliefs of Maori heads, done by Mr. Allen Hutchinson. Given by Col. W. F. Allen:—

5872 Old man, Te Arawa tribe.
5873 Old woman, Te Arawa tribe.
5874 Man, Waikato tribe.
5875 Woman, Taupo tribe.
5876 Boy, Taupo tribe.
5877 Boy. (?)

5880 Collection of implements from the Swiss Lake Dwellers, given by Paul Hofer, Esq., and comprising: 15 stone axes, 9 sockets of deer horn for axes, 8 stone knives, 2 grindstones, 1 stone hammer, 7 sinkers, 15 lance heads, 11 arrow heads, 7 chisels (4 of bone, 2 of stone and 1 made from a tooth), 13 bone awls, 2 bone needles, quantity of cores and flakes of flint, and fragments of horn, bone and boar tusk.

7534 Stone lamp. Hawaiian Ids. Given by Rev. Silas Perry.

7585-7 Flax bags. New Zealand. Given by Mrs. W. F. Allen.

7588 Palm-leaf basket. New Zealand. Given by Mrs. W. F. Allen.

7589 Pair of balls for playing *poipoi*. New Zealand. Given by Mrs. W. F. Allen.

7590 Lime box. Solomon Ids. Given by Mrs. W. F. Allen.

7974 Stone chisel. Kauai, H. I. Given by Paul Hofer, Esq.

7995 Stone sinker. Kauai, H. I. Given by Paul Hofer, Esq.

### *Collected.*

10,023-4 Grindstones for adzes. Oahu, H. I.

10,025-8 Polishing stones. Oahu, H. I.

10,029 Stone sinker. Oahu, H. I.

10,030 Stone hammer. Oahu, H. I.

10,031-2 Poi pounders. Oahu, H. I.

### *Purchased.*

2792-4 Carved human skulls. New Guinea.

2795 Bambu drill for making shell rings. New Guinea.

2796 Piece of shell partly cut. New Guinea.

2797 Block of wood for holding shell. New Guinea.

2799 Paddle. Trobriand Ids.

3070-1 Koko puupuu. Hawaiian Ids.

3568-9 Stone lamps. Hawaiian Ids.

3848 Stone lamp. Hawaiian Ids.

6731-2 Dancing masks. New Ireland.

6760 Spear. New Guinea.

6761 Spear. South Australia.

6762-3 Nosepins. Solomon Ids.

6816 Wooden idol. Oahu, H. I.

7646 Stone dish. Hawaiian Ids.

7647 Stone lamp. Hawaiian Ids.

7905 Club. Marquesas Ids.

10,035-8 Stone adzes. Hawaii, H. I.

10,039 Stone pestle. Hawaii, H. I.

10,040 Stone lamp. Hawaii, H. I.

10,041 Iron adze. Hawaii, H. I.

10,057-61 Ornamented gourd water bottles. Niihau, H. I.

10,062 Large mat made from "Makaloa" (*Cyperus lævigatus*). Niihau, H. I.

10,063-72 Small samples of mats made from "Makaloa." Niihau, H. I.

10,073-4 Stone poi pounder. Hawaii, H. I.

10,075-6 Iron fish barbs. Hawaii, H. I.

10,077-9 Kapa beaters. Hawaii, H. I.

10,080-1 Wooden dishes. Hawaii, H. I.

10,082 Old pistol. Kealakekua bay, Hawaii, H. I.

10,083 Poi bowl. Hawaii, H. I.

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## DEPARTMENT OF ORNITHOLOGY AND MAMMALOGY.

### *Mammals Purchased.*

10,096 Mesoplodon grayi Haast. Chatham Ids. (Skeleton.)

10,202 Physeter macrocephalus Linn. Pacific Ocean. (Skeleton.)

### *Birdskins Purchased.*

10,097 Glaucopis wilsoni Bonap. ♂ Wellington, N. Z.

10,098 " cinerea Gmel. ♂ Nelson, N. Z.

10,099 Creadion carunculatus (Gmel.). ♂ Otago Sound, N. Z.

10,100 " " " ♂ & ♀ " "

10,101 Turnagra crassirostris (Gmel.). ♂ Nelson, N. Z.

10,102 Gerygone flaviventris Gray. ♂ Nelson, N. Z.

10,103 Chitonyx albicapilla Buller. ♀ Wellington, N. Z.

10,104 Sphenœacus punctatus (Quoy & Gaim.). ♀ Wellington, N. Z.

10,105 Acanthidositta chloris (Sparrm.). ♂ Otago, N. Z.

10,106 Chrysococcyx lucidus (Gmel.). ♀ New Zealand.

10,107 Platycercus novæ-zealandiæ (Sparrm.). ♀ Chatham Ids.

10,108 Stringops habroptilus Gray. ♂ Nelson, N. Z.

10,109 Hieracidea ferox Peale. ♂ Wellington, N. Z.

10,110 Thinornis novæ-zealandiæ (Gmel.). ♂ Chatham Ids.

10,111 Larus scopulinus Forst. New Zealand.

10,112 Botaurus pœciloptilus (Wagl.). ♂ Wellington, N. Z.

10,113-4 Phalacrocorax featherstoni Buller. ♂ & ♀ Chatham Ids.

10,115-6 Apteryx australis Shaw & Nodd. ♂ & ♀ Otago, N. Z.
10,117-8 " haastii Potts. ♂ & ♀ Nelson, N. Z.
10,119-20 " maxima Hutt. ♂ & ♀ Stewarts Id.
10,121 Diomedea culminata Gould. New Zealand.
10,122 " fuliginosa Gmel. ♀ Campbell's Id.
10,123 " regia Buller. ♀ New Zealand.
10,124-5 Thinornis novæ-zealandiæ (Gmel.). ♀ Chatham Ids.
10,206 Sula cyanops Sund. Oahu, H. I.

### *Birdskins by Exchange.*

10,090 Æstrelata phæopygia Salv. Galapagos Ids.
10,264 Buteo solitarius Peale. Olaa, Hawaii.

### *Birdskins Given.*

9892 Larus delawarensis Ord. Molokai, H. I. Given by Mr. G. P. Wilder.

9893 Anous stolidus (Linn.). Molokai, H. I. Given by Mr. G. P. Wilder.

10,062-3 Phaëthon lepturus L. & D. ♂ & ♀ Hawaii, H. I. Given by Prof. H. W. Henshaw.

### *Birdskins Collected.*

Collected by Wm. Alanson Bryan, Alvin Seale and Allen M. Walcott.
On Waianae Mts., Oahu, H. I.

9644-93 Oreomyza maculata (Cab.). 26 ♂, 24 ♀.
9694-9745 Chlorodrepanis chloris (Cab.). 24 ♂, 28 ♀.
9746-87 Chasiempis gayi Wilson. 17 ♂, 25 ♀.
9788-93 Vestiaria coccinea (Forster). 3 ♂, 2 ♀, 1 ?
9794-9826 Himatione sanguinea (Gmel.). 19 ♂, 13 ♀, 1 ?
9827-32 Acridotheres tristis (Linn.). 4 ♂, 1 ♀, 1 juv.
9833-4 Charadrius dominicus fulvus (Gmel.). 2 ♀.
9835 Asio accipitrinus (Pall.). ♂
9836-51 Carpodacus mexicanus obscurus McCall. 1 ♂, 7 ♀.
9894 Phasianus versicolor Vieill.
9885 and 91 Himatione sanguinea (Gmel.). ♂ & ♀
9886-7 Chlorodrepanis chloris (Cab.). ♂ & ♀
9888-9 Oreomyza maculata (Cab.). ♂ & ♀

On Hawaii, H. I.

9922 Phaeornis obscura (Gmel.). ♂
9923-4 Chasiempis sandvicensis (Gmel.). ♂ & ♀

9925 Phaeornis obscura (Gmel.). ♂
9926-47 Chasiempis sandvicensis (Gmel.). 7 ♂, 15 ♀.
9948-62 Himatione sanguinea (Gmel.). 7 ♂, 8 ♀.
9963-79 Vestiaria coccinea (Forster). 10 ♂, 7 ♀.
9980-10,019 Chlorodrepanis virens (Gmel.). 24 ♂, 15 ♀, 1 ?
10,020-33 Oreomyza mana (Wilson). 7 ♂, 4 ♀, 3 ?
10,034-9 Heterorhynchus wilsoni Roths. 2 ♂, 2 ♀, 2 ?
10,040 Chasiempis sandvicensis (Gmel.). ♂
10,041-4 Loxops coccinea (Gmel.). 3 ♂, 1 ♀.
10,045-53 Phaeornis obscura (Gmel.). 6 ♂, 3 ?
10,054-7 Viridonia sagittirostris Roths. 3 ♂, 1 ♀.
10,058-9 Carpodacus mexicanus obscurus McCall. ♂
10,060-1 Psittirostra psittacea Gmel.
10,065-6 Buteo solitarius Peale. 1 ♀, 1 ?
10,068-9 Chlorodrepanis virens (Cab.). ♀
10,070-1 Chasiempis sandvicensis (Gmel.). ♂ & ?
10,072-7 Corvus hawaiiensis Peale. 2 ♂, 2 ♀, 2 ?
10,078 Chasiempis sandvicensis (Gmel.). ♀
10,079-80 Nesochen sandvicensis (Vig.). ♂ & ♀

On Oahu, H. I.

10,085-6 Nycticorax nycticorax naevius (Bodd.). ♂ and juv.
10,087 Heteractitis incanus (Gmel.).
10,091-5 Phaëthon lepturus L. & D. 1 ♂, 3 ♀ and juv.
10,203 Nycticorax nycticorax naevius (Bodd.). ♀
10,204 Spatula clypeata (Linn.). ♀
10,205 Charadrius dominicus fulvus (Gmel.). ♂
10,088 Acridotheres tristis Linn.; 15 specimens for skin group. Honolulu.
10,089 Acridotheres tristis Linn. ♂ Honolulu.

### *Bird Skeletons.*

Collected by W. A. Bryan: On Waianae Mts., Oahu, H. I.

9852 Carpodacus mexicanus obscurus McCall. ♂
9853-4 Oreomyza maculata (Cab.). ♂ & ♀
9855 Chlorodrepanis chloris (Cab.).
9856 Chasiempis gayi Wilson. ♂
9857 Vestiaria coccinea (Forster). ♂

### *Birds in Alcohol.*

Collected by W. A. Bryan: On Waianae Mts., Oahu, H. I.

9878 Chasiempis gayi Wilson.
9879-80 Oreomyza maculata (Cab.). ♂ & ♀

9881 Vestiaria coccinea (Forster).
9882 Acridotheres tristis (Linn.).
9883 Carpodacus mexicanus obscurus McCall.
9884 Munia nisoria (Temm.).

### *Nests and Eggs.*

Collected by W. A. Bryan and A. Seale: On Waianae Mts., Oahu, H. I.

9858-63 Carpodacus mexicanus obscurus McCall.
9864 Turtur chinensis (Scop.).
9865-6 Oreomyza maculata (Cab.).
9867-73 Chlorodrepanis chloris (Cab.).
9874-7 Chasiempis gayi Wilson.

## DEPARTMENT OF ICHTHYOLOGY.

Collected by Alvin Seale, John W. Thompson and Allen M. Walcott.
In Hilo, Hawaii, H. I.

275 Cheilio inermis (Forsk.).
276 Synodus variegatus Quoy & Gaim.
277 Polydactylus sexfilis (Cuv. & Val.).
278 Parapercis schauinslandi.
279-80 Teuthis annularis.
281 Gomphosus tricolor Quoy & Gaim.
282 Upeneus vilifex Smith & Swain.
283 Julis (?trilobata Lacép.).
284 Malacanthus hoedtii Bleek.
285 Abudefduf saxatilis (Linn.).
286 Cheilinus zonurus Jenk.
287 Iniistius tetrazonus Bleek.
288 Cheilinus sp.
289 Pomacentrus emarginatus Cuv. & Val.
290 Albula vulpes (Linn.).
291 Upeneus porphyreus Linn.
292 Upeneoides vittatus (Forsk.).
293 Hemirhamphus pacificus Cuvier.
294 Fistularia depressa Günth.
295 Iniistius tetrazonus Bleek.
296-7 Thalassoma verticale.

In Honolulu, Oahu, H. I.

298 Gymnothorax leucosticus.
299 Novaculichthys vanicorensis Quoy & Gaim.

| | |
|---|---|
| 300-1 | Thalassoma duperryi Quoy & Gaim. |
| 302-3 | Gomphosus tricolor Quoy & Gaim. |
| 304 | “ pectoralis Quoy & Gaim. |
| 305-6 | Iniistius pavo Quoy & Gaim. |
| 307 | Hemipteronotus umbrilatus Jenk. |
| 308 | Thalassoma quadricolor (Less.). |
| 309-13 | Pseudocheilinus octotænia Jenk. |
| 314 | Thalassoma sp. |
| 315 | Coris schauinslandi. |
| 316-23 | Chætodon setifer Ben. |
| 324 | “ fremblii Benn. |
| 325-6 | “ quadrimaculatus Gray. |
| 327-8 | “ vittatus Ben. |
| 329 | “ unimaculatus Bloch. |
| 330-3 | “ lunula (Lacép.). |
| 334-42 | “ mantelliger Jenk. |
| 343-6 | Zanclus canescens Günth. |
| 347-8 | Calotomus sandwichensis Cuv. & Val. |
| 349 | Paracirrhites cinctus (Benn.). |
| 350 | Upeneus trifasciatus Lacép. |
| 351 | Abudefduf saxatilis (Linn.). |
| 352-4 | Dascyllus trimaculatus (Rüpp.). |
| 355-8 | Synodus varius Lacép. |
| 359-60 | Caranx speciosus (Forsk.). |
| 361-4 | Teuthis triostegus (Linn.). |
| 365-9 | Cheilio inermis (Forsk.). |
| 370 | Parapercis schauinslandi. |
| 371-2 | Polydactylus sexfilis (Cuv. & Val.) |
| 373-83 | Parachirrites arcatus (Parkins). |
| 384-9 | Caranx sp. |
| 390 | Cheilinus bimaculatus Cuv. & Val. |
| 391 | Apogon sp. |
| 392 | Chætodon ornatissimus (Soland.). |
| 393-5 | Aprion virescens Cuv. & Val. |
| 396 | Teuthis olivaceus (Bl.). |
| 397 | Ctenochætus strigosus Benn. |
| 398-400 | Teuthis sp. |
| 401 | Caranx affinis Rüpp. |
| 402 | Trachurops crumenopthalmus (Bloch.). |
| 403-4 | Caranx sp. |

405 Scomberoides toloo Russel.
406 Amanses sandwichensis Bleek.
407-9 Congrellus sp.
410-12 Eleotris fusca (Schneid.).
413-14 Holocentrus sp.
415-16 “ sp.
417 “ fuscostriatus Seale.
418-21 Parexocœtus mesogaster (Bloch).
422 Malacanthus hoedtii Bleek.
423-5 Platophrys pantherinus (Rüpp.).
426 Apogon menesenus.
427-30 Paracirrhites forsteri (Schneid.).
431-3 Trachinocephalus limbatus.
434 Carassius auratus (Cuv. & Val.).
435-6 Myripristis pralinus Cuv. & Val.
437 “ (? pralinus Cuv. & Val.).
438-41 Cirrhites marmoratus Lacép.
442 Paracirrhites arcatus (Parkins).
443-44 Carangus ciliaris Bloch.
445 Gobius genivittatus Cuv. & Val.
446-48 Cossyphus bilunulatus (Lacép.).
449-52 Gobius sp.
453 Abudefduf saxatilis (Linn.).
454 Balistes buniva (Will.).
455-6 “ capriscus Gmel.
457 Amiurus nebulosus (Le Sueur).
458 Ophicephalus sp.
459 Anampses cuvieri Quoy & Gaim.
460 Cymolutes leclusii (Quoy & Gaim.).
461 Novaculichthys vanicorensis Quoy & Gaim.
462-4 Iniistius niger.
465 Hemicoris iridescens Jenk.
466 “ keleipionis Jenk.
467 Acanthurus guttatus (Forst.).
468-9 Cheilinus zonurus Jenk.
470-1 Thalassoma pyrrhovinctum Jenk.
472 Gomphosus pectoralis Quoy & Gaim.
473 “ tricolor Quoy & Gaim.

474-6 Thalassoma verticale.
477-9 “ sp.
480 Cossyphus sp.
481 Epinephelus quernus Seale, Type.
482 Echidna nebulosa (Ahl).
483 Cossyphus bilunulatus (Lacép.).
484 Priacanthus cruentatus Lacép.
485 Cossyphus (Diastodon) modestus.
486 Scomberoides toloo Russel.
487 Cephalacanthus sp.
488-9 Balistes buniva (Will.).
490 “ mitis Benn.
491-5 “ vidua Ren.
496-7 “ capriscus Gmel.
498-9 “ bursa Valent.
500 Priacanthus cruentatus Lacép.
501-3 Upeneus velifer Smith & Swain.
504-5 “ cherserydros (Lacép.).
506-8 “ pleurostigma Benn.
509 “ cyclostoma (Lacép.).
510 “ punctatus Cuv. & Val.
511-12 “ multifasciatus Quoy & Gaim.
513 “ sp.
514-16 Carangus sp.
517-18 Myripristis pralinus Cuv. & Val.
519-21 Holotrachys lima (Cuv. & Val.).
522-3 Holocentrus microstoma Günth.
524 “ sammara (Forsk.).
525-7 “ tiere Cuv. & Val.
528 Iniistius pavo (Cuv. & Val.).
529-30 Xyrichthys sp.
531 Coris gaimardi Valent.
532 “ pulcherrima Valent.
533 “ flavovittata Benn.
534 Thalassoma sp.
535 Tylosurus annulatus (Cuv. & Val.).
536-8 Albula vulpes (Linn.).
539 Trachurops crumenopthalmus (Bloch).
540 Scorpænapus gibbosa (Schneid.).
541-4 Aulostoma chinense (Linn.).

| | |
|---|---|
| 545 | Sphyræna vulgaris Cuv. & Val. |
| 546 | Euleptorhamphus macrorhynchus (Cuv. & Val.). |
| 547 | Hemirhamphus pacificus Cuvier. |
| 548 | Chromis velox. |
| 549 | Aprion virescens Cuv. & Val. |
| 550-2 | Fistularia depressa Günth. |
| 553 | Tylosurus annulatus (Cuv. & Val.). |
| 554 | " sp. |
| 555-6 | Euleptorhamphus macrorhynchus Cuv. & Val. |
| 557-9 | Chætodon lunula (Lacép.). |
| 560-3 | " mentelliger Jenk. |
| 564 | " unimaculatus Bloch. |
| 565 | " ornatissimus (Soland.). |
| 566-8 | " setifer Ren. |
| 569-71 | Balistapus rectangulus (Bloch). |
| 572 | Balistes vidua Ren. |
| 573 | " buniva (Will.). |
| 574 | Coris gaimardi Valent. |
| 575-7 | " pulcherrima Valent. |
| 578 | Hemicoris keleipionis Jenk. |
| 579 | Paracirrhites forsteri (Schneid.). |
| 580 | " cinctus (Benn.). |
| 581 | Pomacentrus sp. |
| 582 | Cheilinus bimaculatus Cuv. & Val. |
| 583-4 | Zanclus canescens Günth. |
| 585-7 | Abudefduf saxatilis (Linn.). |
| 588 | " [? saxatilis (Linn.)]. |
| 589 | Scolopsis sp. |
| 590 | Kuhlia malo (Cuv. & Val.). |
| 591 | Echidna nebulosa (Ahl). |
| 592 | Cephalacanthus sp. |
| 593 | Eleotris fusca (Schneid.). |
| 594 | Balistes capriscus Gmel. |
| 595-8 | Thalassoma duperryi Quoy & Gaim. |
| 599 | Tetrodon hispidus Linn. |
| 600 | Hemipteronotus umbrilatus Jenk. |
| 601-2 | Holocentrus rubrum (Forsk.). |
| 603-4 | " sp. |
| 605 | Gomphosus tricolor Quoy & Gaim. |
| 606 | Coris pulcherrima Valent. |

607 Upeneus velifer Smith & Swain.
608-10 Thalassoma quadricolor (Less.).
611 Novaculichthys tattoo Seale, Type.
612 Cheilio inermis (Forsk.).
613 Thalassoma sp.
614 Scolopsis sp.
615 Synodus varius Lacép.
616 Tylosurus sp. juv.
617 Thalassoma quadricolor (Less.).
618-19 " sp.
620 Aetobatus narinari (Euphrasen).
621 Balistapus rectangulus (Bloch).
622 Teuthis nigrosus.
623 Monoceros unicornis (Forsk.).
624 Thalassoma sp.
625 Serranus brighami Seale, Type.
626 Holocentrus (? binotatum Quoy & Gaim.).
627 Balistes buniva (Will.).
628 Chætodon lunula (Lacép.).
629-31 Gomphosus tricolor Quoy & Gaim.
632 Dascyllus trimaculatus (Rüpp.).
633 Pomacentrus emarginatus Cuv. & Val.
634 Balistopus rectangulus (Bloch).
635 Synodus varius Lacép.
636-8 Gomphosus pectoralis Quoy & Gaim.
639 Eleotris fusca (Schneid.).
640 Heniochus macrolepidotus Ren.
641-2 Iniistius tetrazonus.
643 Antennarius commersoni (Lacép.).
644 Coris sp.
645 Holocentrus microstoma Günth.
646 Holotrachys lima (Cuv. & Val.).
647 Calotomus sandwichensis Cuv. & Val.
648 Teuthis triostegus (Linn.).
649 Caranx speciosus (Forsk.).
650 Scorpæna parvipennis.
651 Cheilinus bimaculatus Cuv. & Val.
652 Platophrys pavo (Bleek.).
653 Cheilio inermis (Forsk.).

654 Stethojulis albovittata Lacép.
655 " axillaris (Quoy & Gaim.).
656 Belone platura Rüpp.
657 Aulostoma chinense (Linn.).
658 Caranx ferdau (Forsk.).
659 Cheilio inermis (Forsk.).
660 Monocanthus sp.
661 Teuthis nigrosus.
662 Scorpæna cirrhosa (Thunb.).
663 Aetobatus narinari (Euphrasen).
664 Balistes fuscolineatus Seale, Type.
665 Thalassoma quadricolor (Less.).
666 Scorpænopsis cacopsis Jenk.
667 Monocanthus albopunctatus Seale, Type.
668 Scarus gilberti Jenk.
669 Echidna sp.
670 " sp.
671 Ophichthys colubrinus (Bodd.).
672 Scorpænopsis cacopsis Jenk.
673-4 Teuthis achilles.
675 Chætodon unimaculatus Bloch.
676 Brotula marginalis Jenk.
677 Cephalacanthus sp.
678 Ovoides latifrons Jenk.
679 Chætodon bleekeri.
680 Teuthis sp.
681 Thalassoma berendti Seale, Type.
682 Zanclus canescens Günth.
683 Tylosurus sp.
684 Remora albescens (Temm.).

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Königliche Museum für Völkerkunde. Berlin.
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Linnean Society of London.
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Museum of Comparative Zoology. Cambridge, Mass.
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New Zealand Institute. Wellington.
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